

EXHIBIT A

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

)
SONOS, INC.,)
)
Plaintiff,) Civil Action No.
) 6:20-cv-00881-ADA
vs.)
)
GOOGLE, LLC,)
)
Defendant.)

VIDEOCONFERENCE DEPOSITION OF CHRISTOS KYRIAKAKIS

Friday, June 11, 2021

Volume I

Reported by:
KATHLEEN E. BARNEY
CSR No. 5698
Job No. 4626386
PAGES 1 - 202

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Videoconference deposition of CHRISTOS
KYRIAKAKIS, Volume I, taken on behalf of Plaintiff,
beginning at 9:02 a.m. and ending at 3:10 p.m. on
Friday, June 11, 2021, before KATHLEEN E. BARNEY,
Certified Shorthand Reporter No. 5698.

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WITNESS

EXAMINATION

CHRISTOS KYRIAKAKIS

Volume I

BY MR. PAK

8

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Friday, June 11, 2021

9:02 a.m.

THE VIDEOGRAPHER: Good morning. We are on
the record at 9:02 a.m. on June 11, 2021. 09:02:30

All participants are appearing remotely.
Audio and video recording will continue to take
place unless all parties agree to go off the record.

This is Media Unit 1 of the recorded
deposition of Christos Kyriakakis taken by counsel 09:02:49
for the plaintiff in the matter of Sonos, Inc.,
versus Google, LLC, filed in the U.S. District
Court, Western District of Texas, Waco Division,
case number 6:20-CV-00881-ADA.

My name is Kimberlee Decker from Veritext 09:03:12
Legal Solutions. I'm the videographer. The court
reporter is Kathy Barney. I'm not related to any
party in this action, nor am I financially
interested in the outcome.

Counsel and all present will now state their 09:03:26
appearances and affiliations for the record. If
there are any objections to proceeding, please state
them at the time of your appearance, beginning with
the noticing attorney.

MR. PAK: This is Jae Pak, counsel for Sonos, 09:03:33

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1 from Lee Sullivan Shea & Smith.

2 MR. KAPLAN: This is Marc Kaplan from Quinn
3 Emanuel Urquhart & Sullivan for Google and the
4 witness.

5 MR. LEE: Good morning. This is George Lee 09:03:52
6 for plaintiff Sonos. I'm also with the firm of Lee
7 Sullivan Shea & Smith in Chicago.

8 THE VIDEOGRAPHER: Thank you. Will the court
9 reporter please swear in the witness.

10
11 CHRISTOS KYRIAKAKIS,
12 having been administered an oath, was examined and
13 testified as follows:

14
15 EXAMINATION

16 BY MR. PAK:

17 Q Dr. Kyriakakis, could you please state and
18 spell your name for the record.

19 A Sure. First name is -- legal first name is
20 Christos, but I go by Chris, last name is 09:04:34
21 K-Y-R-I-A-K-A-K-I-S.

22 Q Is it okay if I call you Dr. K throughout
23 this deposition?

24 A Yes, please do.

25 Q Have you been deposed before? 09:04:48

1 A I have.

2 Q How many times have you been deposed? Just a
3 ballpark is fine.

4 A Two other times.

5 Q How many times have you been deposed as an 09:04:57
6 expert witness? Were you an expert witness in both
7 of those cases?

8 A Yes, I was.

9 Q And these are patent cases, correct?

10 A Correct. 09:05:16

11 Q When was the last time you were deposed?

12 A It was -- I think it was 2018. I don't have
13 the exact date, but I think it was 2018.

14 Q Sure. Do you remember what case that was?

15 A It was -- so it was two in that same year. 09:05:34

16 So one of them was -- I was working on behalf of
17 Apple, which was an ITC case. Actually, initially
18 the case involved Apple and Samsung as
19 co-defendants. So that was one case. And the other
20 case was for Apple, a separate case. 09:06:05

21 Q Okay. And so we're on the same page, I want
22 to run through some general guidelines. So just
23 bear with me here.

24 I'll ask you questions and you must give
25 truthful answers. Your counsel may object to 09:06:20

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1 questions, but unless your counsel instructs you not
2 to answer, you still must answer despite the
3 objection.

4 Do you understand?

5 A I do. 09:06:30

6 Q And if you don't understand a question or
7 need clarification, please ask. Otherwise I'll
8 assume that you understand the question.

9 We'll plan to take a break every hour or so.
10 If you need a break outside of that schedule, just 09:06:38
11 let me know and I'll accommodate the request. The
12 only thing I ask is, you know, to finish any pending
13 question before we go on break.

14 And the court reporter will be transcribing
15 our discussion today, so I need you to give verbal 09:06:50
16 answers as opposed to head nods or the like.

17 Understood?

18 A Yes.

19 Q Okay. I'll slow down here now.

20 When did you begin working on this case 09:07:02
21 between Sonos and Google?

22 A Oh, I don't know the exact date. It was a
23 few months ago.

24 Q Okay. So it was sometime this year?

25 A Yes. 09:07:16

1 Q Did you sign an engagement letter?

2 A I did.

3 Q And when did you sign the engagement letter,
4 do you remember?

5 A Shortly after I talked to the attorneys and I 09:07:29
6 was told they wanted to retain me. I don't have the
7 exact date. I think it was a few months ago.

8 Q Few months as in maybe April of this year or
9 sometime before?

10 A I'm pretty sure it was before. 09:07:45

11 Q Okay.

12 A I don't have the exact date.

13 Q No, I understand.

14 Who is that engagement between? Is that
15 between you and Google or Google's counsel or 09:07:57
16 someone else?

17 A It is -- I believe it's between me and
18 Google's counsel.

19 Q And Google's counsel being Quinn Emanuel; is
20 that correct?

21 A Correct.

22 Q Have you worked with Quinn Emanuel before?

23 A I have.

24 Q How many times have you worked with Quinn
25 Emanuel? 09:08:18

1 A Probably two other times. It was different
2 attorneys. Different matters.

3 Q What was the nature of your engagement with
4 Quinn Emanuel?

5 MR. KAPLAN: Object to form. 09:08:33

6 THE WITNESS: It was similar. They were
7 patent cases and I was an expert witness for their
8 client.

9 BY MR. PAK:

10 Q Do you recall what cases? 09:08:43

11 A I believe one was Blitzsafe versus Daimler
12 Benz, Mercedes. And the other one escapes me
13 because I remember the cases, but not necessarily
14 all the affiliations.

15 THE VIDEOGRAPHER: You're speaking a little 09:09:26
16 low.

17 THE WITNESS: Interesting. Okay. Is that
18 better?

19 BY MR. PAK:

20 Q Have you provided expert opinions on behalf 09:09:44
21 of Google before?

22 A I have not.

23 Q Have you offered opinions with respect to any
24 Google products?

25 A No. 09:09:55

1 Q Have you offered opinions with respect to any
2 mobile apps that can be installed on your phone or
3 tablet?

4 A No.

5 Q Have you used any Google audio products 09:10:07
6 before?

7 A I have -- yes, I have used them. I don't own
8 them, but I have used them.

9 Q What products have you used?

10 A It was a Google speaker. 09:10:22

11 Q Do you know what speaker it was?

12 A I think it's called Google Home.

13 Q Did you use any specific feature of Google
14 Home?

15 A I was interested in evaluating the voice 09:10:45
16 performance, the voice recognition performance,
17 especially how it performs in noisy environments.

18 Q So you've experimented with Google Assistant;
19 is that correct?

20 MR. KAPLAN: Object to form. 09:11:12

21 THE WITNESS: In the context of that product,
22 yes.

23 BY MR. PAK:

24 Q Okay. Have you used the Google Home app
25 before? 09:11:24

1 A No.

2 Q So how did you set up the Google Home
3 product?

4 A That's a good question. It's been a while.

5 Okay. I guess I used it to set it up. I 09:11:40
6 thought you were asking if I used it to interact
7 with it.

8 Q Okay. Have you used any Google Pixel device
9 before?

10 A No. 09:11:53

11 Q Have you used any Sonos products?

12 A Yes.

13 Q What Sonos products have you used before?

14 A Sonos Play:1. And Sonos Subwoofer.

15 Q Have you used any other Sonos products 09:12:17
16 before?

17 A No.

18 Q Do you own a Sonos Play:1 or Sonos Sub?

19 A Yes, I do.

20 Q When did you first purchase the Play:1 and 09:12:33
21 the Sonos Sub?

22 A Two years ago approximately.

23 Q Why did you purchase the Play:1 and Sonos
24 Sub?

25 A As part of my work and research, I have, I 09:12:59

1 would say, an unusually large collection of speaker
2 products and I've purchased them to evaluate their
3 acoustic performance, compare them to others, and so
4 on.

5 Q Do you own more than one Play:1 and more than 09:13:16
6 one Sonos Sub?

7 A I have three Play:1s and one Sonos Sub.

8 Q Have you ever stereo-paired two Play:1s
9 together?

10 A Yes. Yes, I have. 09:13:47

11 Q And have you compared that to other -- when
12 you say others, you're talking about other audio
13 products?

14 A I guess what do you mean by "compared"?

15 Q Yeah. So you said you evaluated the acoustic 09:14:09
16 performance of the Sonos Play:1 products with
17 others, right?

18 A Yes.

19 Q And who are these others that you're
20 referring to here? 09:14:23

21 MR. KAPLAN: Object to form.

22 THE WITNESS: There's a number of them. Some
23 are home speakers. PSB. Bose. Amazon products.
24 Paradigm is a high-end company that makes wireless
25 speakers. A number of others. 09:14:51

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1 I mean, that's kind of what I do on a regular
2 basis just to understand what is going on and who is
3 doing what acoustically in rooms.

4 BY MR. PAK:

5 Q So have you evaluated these products for 09:15:04
6 other reasons? Other than acoustic performance,
7 have you evaluated these products for some other
8 reason?

9 A No.

10 Q And just for curiosity, I guess, which 09:15:15
11 product has the best acoustic performance, in your
12 opinion?

13 A I'm going to get in big trouble. I'm not
14 going to answer that. A lot of them it's an
15 objective measurement, but a lot of it is very 09:15:35
16 subjective. So I'm probably going to stay away from
17 that one.

18 Q That's fair.

19 I want to talk about your professional
20 experience. Do you have any computer programming 09:15:46
21 experience?

22 A Yes.

23 Q Do you remember the last time you coded or
24 programmed something?

25 A Two days ago. 09:15:59

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1 Q Got it.

2 Have you taught any computer science courses
3 before?

4 A No.

5 Q Have you taught any network courses before? 09:16:09

6 A Network specific, no.

7 I should mention I have computer science
8 students in my courses, but they're not specific
9 under the computer science department.

10 Q Got it. But you haven't taught any computer 09:16:24
11 science courses. Did you say you haven't taught any
12 network courses; is that correct?

13 A That's correct.

14 Q Do you have any networking experience?

15 A Yes. Quite a bit, especially with streaming 09:16:41
16 media. My research group was one of the first to
17 implement multichannel audio streaming across the
18 country over Internet2, and for that we had a large
19 group that was working on various aspects of
20 networking, including peer to peer and other aspects 09:17:05
21 of it. So, yeah, quite a bit of experience.

22 Q What is Internet2?

23 A Internet2 is what the internet was when it
24 first started, which is a network that was closed
25 off to the public and only open to academic and 09:17:24

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1 research institutions. It's a much higher bandwidth
2 network that is basically used for experimentation
3 for next-generation applications on the internet.

4 Q So do you have any experience in designing or
5 implementing a network? 09:17:48

6 A My experience is in coding, testing
7 performance of networks, not necessarily designing
8 networks from scratch. Software that goes on
9 networks, though, yes.

10 Q But you never designed or architected a 09:18:11
11 network, right? Is that right?

12 MR. KAPLAN: Object to form.

13 THE WITNESS: Well, I guess I'm --
14 architected -- I was part of the team. I led the
15 team that architected a multichannel audio streaming 09:18:34
16 solution, Lossless, over a network. And so I didn't
17 build the network from scratch. It was an existing
18 network. We just built the software to run all of
19 that.

20 BY MR. PAK: 09:19:01

21 Q Got it.

22 And you're the founder and CTO of a company
23 called Audyssey Laboratories; is that correct?

24 A That's right.

25 Q And I see the background. Is that an 09:19:07

1 Audyssey Laboratories product behind you?

2 A The loud speaker, no.

3 Q No?

4 A No, it's not. I have one, but it's not in
5 this room.

09:19:21

6 Q What products did you help design at
7 Audyssey?

8 A So Audyssey was a spinout from my research
9 lab at USC with a couple of graduate students. We
10 started in the audio technology licensing business,
11 and so the product there was technologies for
12 automatic measuring of acoustical problems in rooms
13 and solutions for fixing them. And perhaps you've
14 seen the little microphone that comes with home
15 theater equipment. You put it in your living room
16 or your car or IMAX theaters, for example. There
17 are many places that have that.

09:19:36

09:20:01

18 So it started as a software solution that was
19 being licensed. In the course of that company, we
20 also designed some loudspeaker products to showcase
21 the technologies so that we could be fully in
22 control of them.

09:20:23

23 And these were wireless speakers. Three were
24 wireless and one was wired. And so those were --
25 those were the physical products that found

09:20:48

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1 themselves inside the stores like the Apple Store
2 and Best Buy.

3 Q Do you know any Audyssey -- do you know the
4 product names of any of the Audyssey products?

5 A The loudspeakers? 09:21:02

6 Q Yes. Any Audyssey product, really.

7 A So the main Audyssey product was called
8 MultEQ, M-U-L-T-E-Q. That was the name of the
9 umbrella of technologies that had to do with
10 acquiring in-room information, acoustical 09:21:21
11 information, and correcting it. And the logo is
12 still found on many receivers like Marantz and
13 Denon, D-E-N-O-N.

14 The speaker products had -- were named of
15 after interesting, hip neighborhoods. That was the 09:21:51
16 marketing plan. So Lower East Side, Market -- South
17 of Market. Yeah.

18 Q Are you familiar with the Audyssey Sub
19 Equalizer product?

20 A I am, yes. 09:22:19

21 Q What is a sub equalizer?

22 A A sub equalizer -- so in the home theater
23 market, it is popular to have separate components
24 for audio systems. So people will buy their
25 favorite loudspeakers, they will buy their favorite 09:22:39

1 audio receiver amplifier.

2 And for people that already had invested
3 money in a product that didn't have Audyssey room
4 correction in it, we actually made two products.

5 One was called the Audyssey Equalizer, which allowed 09:22:51
6 you to insert it in the path, in the audio path, and
7 take advantage of the Audyssey technologies.

8 And the sub equalizer was basically the same
9 thing except it was only focused on room correction
10 of the subwoofer frequency range, the low 09:23:15
11 frequencies.

12 Q Got it.

13 And I want to introduce an exhibit here.
14 It's the Audyssey manual. And I just uploaded it in
15 the exhibits folder and marked it as Exhibit 1. 09:23:28

16 (Exhibit 1 was marked for identification
17 electronically and is attached hereto.)

18 BY MR. PAK:

19 Q Do you see that?

20 A Not yet. I'm refreshing the screen here. 09:23:34
21 I'm looking at another monitor, so --

22 Q Sure. I am too.

23 THE VIDEOGRAPHER: You have to refresh the
24 browser each time.

25 MR. KAPLAN: Chris, sometimes you can just 09:24:02

1 hit the Marked Exhibits folder again and that will
2 do it.

3 THE WITNESS: Oh, there it is. Okay. I got
4 it. I'm opening it now.

5 BY MR. PAK: 09:24:17

6 Q Do you recognize this document?

7 A Sorry, it hasn't opened yet.

8 Q Sure. Let me know.

9 A Okay. Yes, it's open now.

10 Yes, I recognize it. 09:24:26

11 Q Okay. And this is the Audyssey MultEQ Pro
12 User Guide, correct?

13 A Correct, MultEQ Pro. It was software that we
14 provided to home theater installers. And this was
15 additional functionality than what a consumer could 09:24:45
16 do with the built-in software. And we marketed it
17 as MultEQ Pro.

18 Q I want to turn to PDF, page 14. And there's
19 a connection diagram for the Audyssey Sub Equalizer.

20 Do you see that? 09:25:02

21 A It's coming. Page 14?

22 Q PDF page 14.

23 A Oh, PDF page 14.

24 Q But it's page 10 of the manual.

25 A Okay. 09:25:26

1 Q Okay. So you see the connection diagram for
2 the Audyssey --

3 A Yes.

4 Q Does that look like an accurate
5 representation of the Sub Equalizer? 09:25:33

6 MR. KAPLAN: Object to form.

7 THE WITNESS: It's an accurate representation
8 of how we recommended the connection, yes.

9 BY MR. PAK:

10 Q Was the Sub Equalizer designed to communicate 09:25:48
11 over Wi-Fi?

12 A No.

13 Q Was the Sub Equalizer designed to communicate
14 over Bluetooth?

15 A No. 09:25:58

16 Q Was the Sub Equalizer designed to communicate
17 over Ethernet?

18 A No.

19 Q Was the Sub Equalizer designed to communicate
20 over a data network? 09:26:09

21 A Well, it was designed to accept, process and
22 produce or transmit audio data.

23 So in the context of data -- audio being
24 data, which it is, I would say yes, it's connected
25 to two devices as shown here and it's passing audio 09:26:30

1 data after processing it.

2 Q Well, let me ask you this. The Sub Equalizer
3 was not designed to communicate over Wi-Fi,
4 Bluetooth, or Ethernet. How did it communicate over
5 a data network? 09:27:01

6 MR. KAPLAN: Object to form.

7 THE WITNESS: Well, those are not the only
8 types of networks. Anything that carries data is a
9 data network. So this is an audio data network.

10 BY MR. PAK: 09:27:11

11 Q You're saying these speakers -- how are these
12 speakers connected to the Sub Equalizer?

13 A Through audio cables.

14 Q What kind of -- sorry, I didn't mean to cut
15 you off. 09:27:27

16 A No, no. It's fine.

17 Q What audio cables do you use to connect, you
18 know, one of these speakers to a Sub Equalizer?

19 A They're called line level cables or RCA
20 because of the type of connector, which is named as 09:27:46
21 an RCA connector.

22 Q So if you have a speaker connected to, you
23 know, another device, you know, another device here
24 being a Sub Equalizer via RCA cables, are they
25 communicating over a data network? 09:28:06

1 A In the most general definition of a data
2 network, audio certainly falls into that. And I
3 would consider this a wired data network. To put it
4 in the context of the discussion we're having today,
5 yes. 09:28:27

6 Q Okay. So, I mean, any device that can carry
7 data to another device is a data network; is that
8 correct?

9 MR. KAPLAN: Object to form.

10 THE WITNESS: Any infrastructure that can 09:28:37
11 connect devices and carry data, yes.

12 BY MR. PAK:

13 Q In general, do you have an understanding of
14 what a term of art is?

15 A Yes. 09:28:53

16 MR. KAPLAN: Object to form.

17 BY MR. PAK:

18 Q What is your understanding?

19 A A term of art in my understanding is -- maybe
20 not the exact legal definition -- it's what a person 09:29:05
21 of skill would understand that to mean in the art,
22 in the field.

23 Q Is the term "network" a term of art?

24 MR. KAPLAN: Object to form.

25 THE WITNESS: Yes. 09:29:25

1 BY MR. PAK:

2 Q Before you were engaged as an expert for this
3 matter, did you have an understanding of what
4 network means?

5 A Yes. 09:29:34

6 Q What was that understanding?

7 A Basically what I said a minute ago. A
8 network is an infrastructure of devices and
9 interconnects that allows the flow of data between
10 them. Or enables the flow of data between them. 09:29:54

11 Q Okay. So your definition of a network is the
12 same as a data network; is that correct?

13 MR. KAPLAN: Object to form.

14 THE WITNESS: I think -- a network carries
15 data, so yes. 09:30:19

16 BY MR. PAK:

17 Q Is "data" a term of art?

18 A Yes, it is.

19 Q Before Google engaged you as an expert in
20 this matter, did you have an understanding of what 09:30:41
21 data means?

22 A Yes, absolutely.

23 Q What was that understanding?

24 A Data is in its -- in the highest level
25 definition, data is information. 09:30:53

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1 Q Can data be analog or digital?

2 A Yes, absolutely.

3 Q Is "data network" a term of art?

4 A I would say yes.

5 Q Is there a difference between a network and a 09:31:18
6 data network?

7 MR. KAPLAN: Object to form.

8 THE WITNESS: In the context of what we're
9 speaking of, I would say no. There is a network of
10 people that I have on LinkedIn, but that's a 09:31:35
11 different kind of network. But in this context, I
12 would say no.

13 BY MR. PAK:

14 Q Would you say that a network and a data
15 network are both mediums that carry data? 09:31:54

16 MR. KAPLAN: Object to form.

17 THE WITNESS: In this context, yes.

18 BY MR. PAK:

19 Q Okay. What are the types of devices that can
20 be on a data network? 09:32:15

21 MR. KAPLAN: Object to form.

22 THE WITNESS: The types? What do you mean by
23 "types"?

24 BY MR. PAK:

25 Q Well, for example, you can have a laptop or 09:32:29

1 laptops on a data network, correct?

2 A Correct.

3 Q Are there any other types of devices other
4 than a laptop that can be on a data network?

5 A Anything that allows the passage of data 09:32:45
6 through it that is connected to other devices can be
7 on a data network.

8 So in a studio environment, microphones and
9 loudspeakers are on a data network, and sometimes
10 over very long distances. The control room is in 09:33:06
11 another place. Obviously computers are on a data
12 network. Cell phones are on a data network. Yes.
13 And many other types of devices.

14 Q Sure. And a data network can be wired or
15 wireless, correct? 09:33:26

16 A Correct.

17 Q What are the types of cables or interfaces to
18 transfer data over a wired data network?

19 MR. KAPLAN: Object to form.

20 THE WITNESS: Over wired? 09:33:39

21 BY MR. PAK:

22 Q Yes. I -- well, I assume in a wireless data
23 network you wouldn't need cables, right?

24 A Right. Correct.

25 In a wired one, I mean, I guess anything that 09:33:51

1 can establish electrical connection. So it would
2 be -- it could be copper, it could be optical, it
3 could be Ethernet. There's probably others that I'm
4 forgetting, but --

5 Q You mentioned earlier RCA cables, you can use 09:34:20
6 an RCA cable to --

7 A Yeah. Those fall into copper for me, but
8 yes.

9 Q Got it. What about speaker wires, does that
10 fall under copper? 09:34:33

11 A Also under copper.

12 Q Does a data network require devices to
13 transfer data in a certain format to communicate
14 with another device that is on the network?

15 A There has to be -- the devices have to 09:34:47
16 understand the data coming in. So if that is what
17 you mean by format, then yes. If not, there are
18 translator devices that can convert it.

19 Q Okay. So when a device transfers data to
20 another device on a data network, there's got to be 09:35:14
21 some kind of protocol, right?

22 A Yes.

23 MR. KAPLAN: Object to form.

24 BY MR. PAK:

25 Q What are the protocols that are required for 09:35:25

1 a data network?

2 A There's a pretty large number of them. A
3 common protocol is to -- is based on the principal
4 of modulation. Again, I'm speaking in the context
5 of our discussion today and the matters here. 09:35:45

6 So in a modulation concept, the modulation
7 type protocol is understood to take in data, put it
8 in a certain form so that the receiving device can
9 understand it. Since we're speaking of audio, pulse
10 code modulation is a common one. 09:36:14

11 There are optical protocols called SPDIF,
12 Sony Phillips Digital Interchange Format. There
13 are, of course, computer-to-computer protocols such
14 as Ethernet. And several others.

15 Q Okay. Specifically if a device wants to 09:36:49
16 communicate with another device on an internet-based
17 network, what protocols are required for that
18 communication?

19 MR. KAPLAN: Object to form.

20 THE WITNESS: Can you define internet-based 09:37:10
21 network for me, please?

22 BY MR. PAK:

23 Q Yeah. So communicate over Wi-Fi or Ethernet,
24 for example.

25 MR. KAPLAN: Object to form. 09:37:20

1 THE WITNESS: Oh, I'm sorry. Did you say
2 Ethernet or internet?

3 BY MR. PAK:

4 Q Wi-Fi or Ethernet.

5 A Ethernet. I see. 09:37:29

6 Q Yeah.

7 A So the format for those is -- I mean, there's
8 a Wi-Fi standard under the 802.11 IEEE, Institute of
9 Electrical and Electronics Engineers, and that
10 standard has been established for -- the devices 09:37:52
11 that want to talk to each other on Wi-Fi have to
12 implement that standard on the transmitter and the
13 receiver so that they can communicate.

14 There are also standards for Ethernet. A
15 common one is TCP, Transfer Control Protocol. There 09:38:10
16 are others.

17 Q Can you name some of the other protocols?

18 MR. KAPLAN: Object to form.

19 THE WITNESS: There are Asynchronous Transfer
20 Mode, ATM. Token Ring kind of networks. And a 09:38:43
21 variation of that, which is a Star network.

22 That's what comes to mind now. I'm sure I
23 can think of more later.

24 BY MR. PAK:

25 Q Are there any other Wi-Fi standards other 09:39:18

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1 than 802.11?

2 A Well, there are other Wi-Fi methods that are
3 proprietary to individual companies that may -- that
4 don't have to comply with 802.11 between their own
5 devices. I don't know how they work because they're 09:39:45
6 proprietary, but they do exist.

7 Q And these protocols you mentioned, like
8 802.11, for example, or TCP, they require data to be
9 sent in a certain format; is that correct?

10 MR. KAPLAN: Object to form. 09:40:02

11 THE WITNESS: Those protocols, the standards
12 require, yes, data to be in a certain type. Just
13 like all the other protocols.

14 BY MR. PAK:

15 Q Do the Wi-Fi and Ethernet standards require 09:40:17
16 data to be sent in data packets?

17 A The 802.11 Wi-Fi does. The Ethernet, as I
18 said, you can -- Ethernet is basically the cable.
19 Different protocols can run on it. TCP/IP is data
20 packets, yes. Or it's based on data packets. 09:40:37

21 Q Are there any Wi-Fi Ethernet standards that
22 don't require data to be sent in the form of data
23 packets?

24 A As I said, I don't know the Wi-Fi inner
25 workings of the proprietary ones, so I'm not sure I 09:40:58

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1 can answer that. Or the wired ones.

2 There are multi-room systems that have been
3 around in the home installer market for a long time
4 that use Ethernet. But it's not necessarily a
5 standard Ethernet, based on a standard. So I 09:41:16
6 couldn't say for sure what they use.

7 Q Okay. And I want to introduce another
8 exhibit here. Just give me one minute.

9 A Sure.

10 Q Okay. I just uploaded Exhibit 2. Let me 09:41:33
11 know if you see it.

12 A Yes. Okay.

13 (Exhibit 2 was marked for identification
14 electronically and is attached hereto.)

15 BY MR. PAK: 09:41:57

16 Q Do you recognize this document?

17 A No.

18 Q Okay. Well, I'll represent to you that these
19 are slides from a computer networks course from
20 Cornell University that I downloaded from the 09:42:11
21 internet.

22 Do you see on the first page it says "CS519:
23 Computer Networks," correct?

24 A I do.

25 Q And it's a lecture from January 24, 2004, 09:42:18

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1 right?

2 A Yes.

3 Q Okay. And I want to focus on the slide 6, so
4 PDF page 6.

5 A They're not numbered. What is the title of 09:42:35
6 the slide?

7 Q It says, "What is a data network?"

8 A I see it.

9 MR. KAPLAN: Chris, I don't mean to
10 interrupt, but if you sort of scroll your mouse over 09:42:48
11 the exhibit, it will show the page numbers there.

12 THE WITNESS: Yeah, I just realized. But for
13 some reason it's showing as page 5 for me. But,
14 okay, I do see it.

15 BY MR. PAK: 09:43:00

16 Q I guess it is page 5. Page 5 of the PDF.

17 A Yes.

18 Q And it says:

19 "What is a data network?" And

20 then, "The answer is not a network 09:43:09
21 that carries data."

22 Do you see that?

23 A I do.

24 Q And the slide explains that one reason why a
25 data network is not a network that carries data is 09:43:20

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1 because you can send data over a voice network,
2 which is often a euphemism for a circuit network,
3 and a voice network is not a data network.

4 Do you see that?

5 A I do. 09:43:36

6 Q Do you agree with that statement?

7 A Not at all.

8 Q Why do you disagree?

9 A I think it's an appropriate statement for a
10 packet network course -- for a network course, it's 09:43:44
11 appropriate for that kind of class, but I don't
12 think that's a general statement that is true
13 because data -- networks carry data. That's the
14 very definition of a network.

15 I don't know this class, but it sounds like 09:44:09
16 they're going to be talking about a subset of
17 networks that carry packet data, and they certainly
18 exist.

19 Q Well, you say you never taught a course in
20 computer networks; is that right? 09:44:22

21 A Yes.

22 Q Do you agree that a voice network is a
23 euphemism for a circuit network?

24 A No. That is not a term of art.

25 Q Why do you disagree? 09:44:32

1 A First of all, I never heard that euphemism,
2 and I'm pretty familiar with the field of streaming
3 audio and networks and use for that, and voice. I
4 think a voice network is a data network. It's
5 carrying voice data. 09:44:59

6 Q Well, what is a voice network?

7 A It's a network that carries voice. For
8 example, a telephony network.

9 Q Could you give me some other examples of a
10 voice network? 09:45:23

11 A If we're talking about a network that only
12 carries voice, then I think telephony is probably
13 the only one that comes to mind. There are other
14 networks that carry voice and other things, like
15 cellular networks and cell phone networks. But if 09:45:42
16 we're talking about just voice, then I would think
17 telephony is the -- I -- I just thought of another
18 one. A walkie-talkie network that has multiple
19 wireless devices that a firefighter department would
20 use, that is a voice network and it carries data. 09:46:01

21 Q So a walkie-talkie network, in your opinion,
22 is a data network?

23 A Well, I guess walkie-talkie network is --
24 walkie-talkie is the devices on a wireless network
25 that exchange voice data. 09:46:25

1 Q And what protocol does this wireless network
2 use to exchange voice data?

3 A Most of them are based on radio frequency,
4 RF. But the protocols, again, I think are
5 proprietary to the individual companies that make 09:46:48
6 them, like Motorola and others.

7 Q And when you say a telephony network, are you
8 referring to a public switch telephone network?

9 A Yes.

10 Q Okay. So a public switch telephone network 09:47:05
11 is a voice network; is that right?

12 A Yes.

13 Q Is a cellular network a voice network?

14 A Well, as I said before, it can be a voice
15 network if all that anyone does on it is speak on 09:47:23
16 the phone. But it is capable of other information
17 as well on that network. So it's not exclusively
18 voice.

19 Q So a cellular network can either transmit
20 voice or data, right? 09:47:36

21 A No.

22 MR. KAPLAN: Object to form.

23 THE WITNESS: Voice -- a cellular network
24 transmits or carries data. Voice is data as far as
25 it's concerned. 09:47:53

1 BY MR. PAK:

2 Q Right. So a cellular network can carry data
3 in the form of voice, right, or non-voice data; is
4 that right?

5 A Right. 09:48:05

6 Q So how do you transmit voice data over a
7 cellular network?

8 A Well, it depends on what kind of cellular
9 network. There are different kinds of cellular
10 networks. So the first ever created was probably, I 09:48:25
11 would say, in Japan in 1979 or 1980, somewhere
12 there. And it was an analog-based system where --
13 and I guess at the time that would have been truly
14 for voice because I don't think there was other
15 multimedia data being sent over the network. 09:48:47

16 So that was through a mechanism called
17 frequency division multiplexing, which basically is
18 a protocol for splitting up the audio bandwidth into
19 different bands and then dividing them into
20 different bands, and then blending them all together 09:49:04
21 when they arrive at the other end. So that was a
22 purely analog system. And, actually, it's still in
23 existence in some parts of the world.

24 There are also digital systems, and they have
25 increased over the years from -- starting from 2G, 09:49:23

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1 which was the first one, all the way to what we have
2 today, which is 5G, increasing the bandwidth of each
3 connection and also total bandwidth to improve
4 quality and speed.

5 Q So in a digital cellular network, what -- 09:49:47
6 when you transmit data, what -- what form does that
7 data take? Is -- does it have to take the form of
8 data packets?

9 A The standards dictate the form. So there are
10 different schemes. There's time division 09:50:16
11 multiplexing, which was the next evolution after
12 frequency division. I would say, yes, the majority
13 of those are probably packet based.

14 Q Are there any digital cellular networks that
15 are not packet based? 09:50:32

16 A I don't know. That would be a pretty
17 sweeping statement for me to make without looking
18 into it a little bit more.

19 I can't think of an example off the top of my
20 head, but I don't want to say no for sure because I 09:50:49
21 would have to look into it.

22 Q Sitting here today, you can't think of any
23 digital cellular networks that are packet based --
24 that are not packet based? Let me -- let me start
25 over. 09:51:04

1 Sitting here today, you can't think of a
2 digital cellular network that is not packet based,
3 correct?

4 A Correct, but that's not -- I'm not saying
5 that they don't exist, just that I can't think of 09:51:15
6 one.

7 Q So you said in a cellular network, you can
8 either transmit voice data or non-voice data, right?

9 A Right.

10 MR. KAPLAN: Object to form. 09:51:35

11 BY MR. PAK:

12 Q So in a cellular network, is -- is voice data
13 transmitted differently than non-voice data? Do
14 they take different paths?

15 MR. KAPLAN: Object to form. 09:51:50

16 THE WITNESS: Well, it kind of depends. If
17 you're communicating with somebody else on another
18 cellular phone, for example, the path between you
19 and the other person may be different because of the
20 way cellular networks work. If you're using your 09:52:09
21 phone to send data to a device in your house, that
22 would be a different path as well.

23 So I guess I wasn't fully clear on your
24 question.

25 /////

1 BY MR. PAK:

2 Q I want to go back to the slide here. It
3 says:

4 "Data network is often a
5 euphemism for packet network." 09:52:36

6 Do you agree with that statement?

7 A I do not.

8 Q And you disagree with the statement because a
9 data network is any type of network that carries
10 data; is that -- is that correct? 09:52:52

11 A That's correct. And the data can be in many
12 different forms and it could be analog or digital.
13 But even within those, it can be different protocols
14 for each one of those.

15 Q Is a voice network a packet network? 09:53:06

16 MR. KAPLAN: Object to form.

17 THE WITNESS: A voice network can be packet
18 based, yes. But there are many -- the original
19 PBX-type switches were not. Those were a voice
20 network that was analog. And then later other 09:53:31
21 networks came out that are digital.

22 But analog voice networks still exist and are
23 in use in many places, including elevators for
24 safety and places where you want the internet not to
25 fail, especially for safety applications. 09:53:47

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1 BY MR. PAK:

2 Q Okay. So an analog voice network is not a
3 packet network, correct?

4 A An analog -- no, it is not.

5 Q Is a digital voice network a packet network? 09:54:01

6 A As I said before, most of them are. There
7 might be examples where they're not, but I don't
8 know one off the top of my head. I would say most
9 are.

10 Q And I want to take a look at -- let me find 09:54:20
11 the right slide here. I think it's PDF page 9 of
12 the slides. The header says "Packet Network versus
13 Circuit Network."

14 Do you see that?

15 A Yes. 09:54:44

16 Q So this slide says:

17 "Packet Network versus Circuit
18 Network. By contrast, packet network
19 allows small units of data packets to
20 be individually sent to different 09:54:55
21 destinations."

22 Do you see that?

23 A I do.

24 Q Can you send data packets over a circuit
25 network? 09:55:04

1 A Probably not. I'm trying to figure out what
2 the "by contrast" means here. Is there a previous
3 slide that contrasts to something?

4 Q Yeah. So in the context, you know, the
5 header says, "Packet Network versus Circuit 09:55:32
6 Network." So "by contrast" here it's comparing a
7 packet network to a circuit network; is that
8 correct?

9 A Yes.

10 Q So unlike a circuit network, this slide says: 09:55:42

11 "A packet network allows small
12 units of data packets to be
13 individually sent to different
14 destinations."

15 Is that right? 09:55:59

16 MR. KAPLAN: Object to form.

17 THE WITNESS: Right. But -- so in a digital
18 switching -- a digital circuit network, that could
19 also be true, right?

20 So I understand what they're trying to say 09:56:15
21 here for the purposes of this class that they're
22 teaching, but I guess reading the sentence by
23 itself:

24 "A packet network allows packets
25 of data to be sent to different 09:56:30

1 destinations."

2 Yes, I would agree with that.

3 BY MR. PAK:

4 Q Can a circuit network be digital or analog?

5 A Yes. 09:56:39

6 Q What's an analog -- what are some examples of
7 analog circuit networks?

8 A Well, those are the original telephony
9 products that connect to POTS, plain old telephone
10 system lines. You still find limited -- you find 09:56:56
11 them in network closets of many companies or other
12 organizations. So, yes, there are analog switching
13 or circuit networks that still exist.

14 Q You said those are examples of an analog
15 voice network, right? 09:57:31

16 A Right.

17 Q So is a voice network not a circuit network?

18 A A voice network --

19 Q Let me ask you a different question.

20 Is a voice network synonymous -- synonymous 09:57:49
21 with the term circuit network?

22 A No.

23 Q How are they different?

24 A A circuit network is something that requires
25 a physical connection to be made of the sending 09:58:02

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1 location and the receiving location. You think of
2 it as the old telephone operator plugging in patch
3 cords. So that's a circuit network. What it
4 carries is voice. And so I guess it's not a term
5 that I often use, but it is a term that I guess 09:58:21
6 people use calling it a voice network. You could
7 send other things over an analog switching network.

8 Q And you said earlier that public switch
9 telephone network is a voice network, right?

10 A I said -- I don't remember what I said. The 09:58:41
11 public switch network can be used as -- for voice.

12 Q Can a public switch telephone network be used
13 in a circuit network?

14 MR. KAPLAN: Object to form.

15 THE WITNESS: It's not to be used in. It's 09:59:05
16 implemented using circuit networks, or circuit
17 network devices.

18 BY MR. PAK:

19 Q Well, let me ask you this way. Is a voice
20 network a type of circuit network? 09:59:28

21 A Yes.

22 Q Okay. I want to introduce a new exhibit
23 here, Exhibit 3. Just give me one minute.

24 (Exhibit 3 was marked for identification
25 electronically and is attached hereto.) 10:00:11

1 BY MR. PAK:

2 Q Okay. I just uploaded Exhibit 3. Let me
3 know when you see it.

4 A I see it.

5 Q Do you recognize this document? 10:00:23

6 A I recognize maybe not this edition of it, but
7 I have seen the computer dictionary before, yes.

8 Q Okay. Yeah, so this is an excerpt from the
9 Microsoft Computer Dictionary, Fifth Edition.

10 And you said you're not sure if you read this 10:00:44
11 edition, but you've looked through the Microsoft
12 Computer Dictionary before, right?

13 A Yes, I have.

14 Q I want to look at page 3. At the bottom, do
15 you see a definition for a data network? 10:01:04

16 A Yes.

17 Q Could you please read that definition for the
18 record?

19 A

20 "A network designed for 10:01:15
21 transferring data encoded as digital
22 signals, as opposed to a voice
23 network, which transmits analog
24 signals."

25 Q So like the Cornell University slide we just 10:01:25

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1 looked at, the Microsoft Dictionary distinguishes a
2 data network from a voice network, correct?

3 MR. KAPLAN: Object to form.

4 THE WITNESS: That's what it says.

5 BY MR. PAK: 10:01:48

6 Q Do you agree with this definition of data
7 network from the Microsoft Computer Dictionary?

8 A I agree with parts of it. A network designed
9 for transferring data. But I don't agree that it
10 has to be digital. 10:02:00

11 Q What does transferring data mean?

12 A In this context, I think because it's
13 Microsoft, it means -- I assume it means data from
14 one computer is moved to another computer.

15 Q So it talks about sending and receiving data, 10:02:31
16 right?

17 A I don't -- maybe transferring means -- to me
18 means taking it from one place to another. I don't
19 see anything in this definition that implies it's
20 bidirectional. 10:02:53

21 Q What do you mean by "bidirectional"?

22 A Sending and receiving, as you said, between
23 two devices, for example.

24 Q Okay. So this definition, you disagree that
25 a data network is limited to digital signals, right? 10:03:29

1 A Correct.

2 Q Why do you disagree?

3 A Because I think we talked about several
4 examples of networks that carry analog signals, and
5 so it's not an opinion. I mean, the existence of 10:03:47
6 those networks proves it doesn't have to be digital.

7 Q And earlier, you know, as we discussed, your
8 opinion is that a voice network can transmit analog
9 signals, but it can also transmit digital signals;
10 is that correct?

11 A Yes.

12 MR. KAPLAN: Object to form.

13 THE WITNESS: Yeah, I agree with that.

14 BY MR. PAK:

15 Q Okay. Is local area network a term of art? 10:04:17

16 A Yes, it is.

17 Q Before Google engaged you as an expert for
18 this matter, did you have an understanding of what
19 local area network means?

20 A Yes, I did. 10:04:31

21 Q What was that understanding?

22 A It is a -- again, infrastructure or medium
23 for connecting multiple devices for the purpose of
24 exchanging data.

25 Q What are the types of devices that can be on 10:04:50

1 a local area network?

2 A They can be -- because I work a lot with
3 studios and other things, it can be mixing consoles,
4 loudspeakers, computers, microphone preamplifiers,
5 printers. There's a very large list of things it 10:05:16
6 could be on this kind -- on a local area network.

7 Q A local area network can be wired or
8 wireless, correct?

9 A Yes.

10 Q What are the types of cables used to transfer 10:05:29
11 data over a wired local area network?

12 A It's similar to the list that we talked about
13 before in terms of data networks. It's copper and
14 all types of copper connections, including audio
15 cables, speaker cables, Ethernet, coaxial cables, 10:05:53
16 optical cables. That's probably a good list.

17 Q So if a speaker is connected to the Sub
18 Equalizer, for example, via a RCA cable -- let me
19 start over.

20 So if a speaker is connected to another 10:06:24
21 device, such as the Sub Equalizer via RCA cables, is
22 that on a local area network?

23 A Yes. Those are exchanging data.

24 Q Does a local area network require devices to
25 transfer data in a certain format to communicate 10:06:51

1 with another device?

2 A It does. The devices on that network have to
3 all have an agreed-upon representation of the data
4 or use an appropriate translator to make it
5 understandable to them, but yes. 10:07:08

6 Q So devices on a local area network have to
7 communicate using a specific network protocol,
8 right?

9 A Yes.

10 Q What are those network protocols? 10:07:25

11 A So there are -- again, because I come from
12 the audio world, there are modulation protocols,
13 such as pulse code modulation, pulse width
14 modulation, optical data protocols, which are
15 digital. Well, all the ones I mentioned are 10:07:49
16 digital.

17 And then there are also the -- if we're
18 talking about printers and computers, then there are
19 the TCP internet protocols.

20 Q Are these analog protocols or digital 10:08:04
21 protocols?

22 A Well, I guess I don't think of a protocol as
23 analog or digital. It's -- there are protocols for
24 analog data and there are protocols for digital
25 data. Perhaps that's what you meant? 10:08:36

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1 Q Yeah, that's what I meant, actually.

2 What are the protocols for analog data for a
3 local area network?

4 A So they're modulated -- so FM is -- not the
5 radio kind of FM, but frequency or amplitude 10:09:02
6 modulation of audio data can be sent over cables and
7 demodulated at the receiving side and be converted
8 back to audio. That's one that comes to mind for
9 analog.

10 Q Are there any other protocols for analog data 10:09:26
11 over a local area network?

12 A The method that I talked about before for the
13 1G cellular networks, frequency division
14 multiplexing, that can also be applied to wired
15 local area networks as well. 10:09:50

16 Q What are the protocols for digital data over
17 a local area network?

18 A It depends on the data. So if it's -- again,
19 if we're talking about multimedia audio data, those
20 can be the ones that I mentioned before, the pulse 10:10:12
21 code or pulse modulation or optical, SPDIF.

22 If we're talking about computers and
23 printers, those are TCP-type protocols. But there
24 are others. There are peer-to-peer connections that
25 can happen. 10:10:36

1 Q When you transmit digital data over a local
2 area network, does that data have to take the form
3 of digital data packets?

4 A No, it doesn't have to.

5 Q What other forms can that data take? 10:11:00

6 A The examples I was giving before, some kind
7 of a modulation. So pulse code or pulse width
8 modulation. So, no, it doesn't have to be packet
9 based.

10 Q When we talked about modulations, you 10:11:30
11 referred to them as analog data; is that right?

12 A No. The one kind, frequency division, is the
13 analog. But the -- so pulse code and pulse width,
14 the examples I'm using here, require the translator
15 device. 10:11:54

16 So let's say you have an audio device that's
17 sending out analog audio, but you want to connect it
18 over a local network to other devices to receive
19 that audio, the wired network. You might convert it
20 to digital audio and then use -- and that conversion 10:12:16
21 puts it in the forms of pulse code modulated or
22 pulse width modulated audio. Most common is pulse
23 code. It's sent over the network in that format and
24 then the opposite operation happens at the receiving
25 end. 10:12:37

1 So these converter devices are in many cases
2 built into the audio source and receiver and
3 sometimes they can be separate.

4 Q So when you convert audio into digital form
5 in pulse code modulator or pulse width modulated 10:12:55
6 audio data, and you transmit that over a network,
7 does that data have to take the form of data
8 packets?

9 A No.

10 Q What does that data -- what form can that 10:13:19
11 data take other than data packets?

12 A You can think of it as a stream of zeroes and
13 ones because it's digital now.

14 I guess the best analogy I can think of is in
15 Morse code you can have a long beep or a short beep, 10:13:39
16 and so the pulses can be wide to represent, let's
17 say, a one or short to represent a zero and then
18 that pattern is read in by the receiving device and
19 converts back to audio.

20 Q Does an infrared remote that sends infrared 10:14:00
21 signals to a TV amount to a coupling by way of a
22 local area network?

23 A Yes. It's sending data to a TV in this case,
24 right? So over an agreed-upon protocol. So yes.

25 Q So as long as data is being carried over to 10:14:36

1 another device using some agreed-upon protocol,
2 you're saying that that is enough to be on a local
3 area network; is that right?

4 MR. KAPLAN: Object. Form.

5 THE WITNESS: It's enough to be on a network. 10:14:55
6 Local area usually is used as a term of art to
7 differentiate it from larger networks. But, yes, I
8 agree.

9 BY MR. PAK:

10 Q What do you mean by a local area usually is 10:15:16
11 usually used as a term of art to differentiate it
12 from large networks?

13 A The industry uses these terms to give an idea
14 of the magnitude of the size of the overall network.
15 So they are, for example, wide area networks that 10:15:41
16 would consist possibly of multiple local area
17 networks and are generally considered to cover much
18 larger areas geographically. So it's kind of a
19 layered terminology. There are also metropolitan
20 area networks that typically are associated with a 10:16:03
21 city.

22 There's no hard definition of where the
23 boundary of one ends and another one begins, but one
24 would understand that a wide area network involves a
25 much larger geographic area than a local area 10:16:16

1 network.

2 Q So local area network covers a limited area
3 compared to a wider network; is that right?

4 A I wouldn't say limited. It's just smaller
5 than the wide area network. All networks are 10:16:42
6 limited by area. Wide area networks are also
7 limited, perhaps to planet earth. But it's just a
8 terminology for relative size. So one would
9 understand a local area network has fewer devices on
10 it than a wide area network. 10:16:57

11 Q Let me ask you this way, then. A local area
12 network covers a limited geographical area; is that
13 right?

14 A As I said, a smaller geographic area. It can
15 be quite large. That's why I objected to "limited." 10:17:16
16 It can be pretty big. And then you say, okay, what
17 about wide? Wide area network would be bigger.

18 Q Correct, right. So local area network covers
19 a smaller geographical area than a wide area
20 network; is that right? 10:17:32

21 A Yes.

22 Q Is there a difference between a data network
23 and a local area network?

24 A Well, a local area network is a subset of the
25 data networks. 10:17:56

1 Q Right. So there is a difference between a
2 data network and a local area network, right?

3 A No. A local area network is a data network.
4 But it has this additional attribute that is used to
5 compare it to larger data networks, which are called 10:18:13
6 wide area networks.

7 Q What is -- where are those additional
8 attributes that make a data network a local area
9 network?

10 A They are used in -- when making comparisons 10:18:27
11 between two networks to differentiate usually by the
12 number of devices or the geographical area that is
13 covered.

14 So they're all data networks, but the wide --
15 it's generally understood that a wider network has 10:18:48
16 many more devices or covers a wider geographical
17 area than a local area network.

18 Q Are there any other additional attributes
19 that make a data network a local area network?

20 A Not that I can think of at the moment, no. 10:19:04

21 Q Do you know any examples of a wide area
22 network?

23 A Yes. I don't know if there's a name for it,
24 but the Western United States internet
25 infrastructure is generally considered a wide area 10:19:37

1 network. Internet2 that we mentioned before is a
2 wide area network.

3 Q Do you know any other examples of wide area
4 networks?

5 A I would say satellite networks perhaps that 10:19:51
6 cover a part of the globe under their view are also
7 wide area networks.

8 Q How do you transmit data over a satellite
9 network?

10 A In multiple ways. It could be radio 10:20:22
11 frequency based modulation or it could be packet
12 based, like it is for cell phones or cell networks.

13 Q Can you transmit analog data over a satellite
14 network?

15 A Analog data -- I'm trying to think of -- for 10:20:41
16 example, a short-wave radio is a kind of a network
17 that uses analog data over large distances. It's
18 possible that it's rebroadcast through satellites.
19 I'm not sure. I think technically you can.

20 I can't think of an example at the moment, 10:21:13
21 but there's no reason that you couldn't.

22 Q Do you know any satellite networks that
23 transmit analog data?

24 A Not off the top of my head. I mean, I know
25 an old example -- communication with the Apollo 10:21:33

1 astronauts was done through radio waves. Perhaps
2 eventually that became digital. But, no, I can't
3 think of an example off the top of my head.

4 Q Does data that is transmitted over a
5 satellite network have to take the form of data 10:21:55
6 packets?

7 A I don't think that's required, no.

8 Q What other forms of data can be transmitted
9 over a satellite network?

10 A There are other modulation schemes that can 10:22:09
11 be used. Radiofrequency modulation schemes can be
12 used to transmit data over satellites.

13 MR. PAK: How about we take a break, a quick
14 break? Maybe come back in five minutes. Is that
15 okay? 10:22:41

16 THE WITNESS: Sure.

17 THE VIDEOGRAPHER: We are off the record at
18 10:22 a.m.

19 (Recess.)

20 THE VIDEOGRAPHER: We are on the record at 10:30:10
21 10:30 a.m.

22 BY MR. PAK:

23 Q Dr. K., I want to explore a couple more
24 examples regarding local area networks.

25 A Okay. Before we get started, before you ask 10:30:25

1 your question, I -- as I was walking upstairs, I
2 thought of an example, if I could amend my previous
3 answer.

4 An example of analog communication over
5 satellites is of course the obvious one, broadcast 10:30:38
6 television. Early days of broadcast television was
7 analog signals being sent over satellite. That's an
8 obvious one. Okay.

9 Q Does a cell phone communicate with a
10 Bluetooth headset amount to a coupling by way of 10:31:07
11 local area network?

12 A Yes.

13 Q Wasn't Bluetooth a type of personal area
14 network?

15 A Again, these definitions are kind of 10:31:26
16 arbitrary in the sense that there is no hard line of
17 distance that goes from one to the other. It's a
18 small local area network, but if I have a speaker 20
19 feet away from me communicating by Bluetooth, then
20 maybe that could be a local area network. It's not 10:31:46
21 a hard definition.

22 Q Does local area network cover a broader
23 geographical area than a personal area network?

24 A By consensus of people in the field thinking
25 of it that way. It's not something technical that 10:32:07

1 causes that. But yes.

2 Q Are there any other differences between a
3 local area network and a personal area network?

4 A Probably the number of devices in a local
5 area network would be higher than the number of 10:32:24
6 devices in a personal area network that are
7 possible.

8 Q Are there any other differences between local
9 area network and a personal area network?

10 A I can't think of one, no. 10:32:36

11 Q So earlier you said, you know, communicating
12 over two walkie-talkies could amount to a coupling
13 by way of a data network, right?

14 A Yes.

15 Q And that's because you can carry data from 10:33:04
16 one walkie-talkie to another walkie-talkie, correct?

17 A Correct.

18 Q What if I just had, you know, two cups on a
19 string and I used that to communicate with George,
20 who is right by me, is that on a data network? 10:33:25

21 MR. KAPLAN: Object to form.

22 THE WITNESS: That's a bit of an extreme
23 example, but if your voice carried over the string
24 and the string was carefully selected and there was
25 no background noise, yeah, it's data. Your data is 10:33:46

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1 getting across to somebody else to another device.

2 Not a very sophisticated one, but yes.

3 BY MR. PAK:

4 Q So as long as two devices or two nodes carry
5 data, that's going to be on a data network, in your 10:34:02
6 opinion?

7 A Yes.

8 MR. PAK: Okay. I'm going to introduce
9 Exhibit 4. I actually uploaded it on the break and
10 marked it as Exhibit 4. Just let me know when you 10:34:27
11 see it.

12 THE WITNESS: I see it.

13 (Exhibit 4 was marked for identification
14 electronically and is attached hereto.)

15 BY MR. PAK: 10:34:45

16 Q Do you recognize this document?

17 A Yes.

18 Q This is your -- this is one of your
19 publications; is that right?

20 A That's right. 10:34:51

21 Q And the title says, "RMI System: Internet
22 Meets the Future Home Theater," right?

23 A Correct.

24 Q At a high level, what is this publication
25 about? 10:35:07

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1 A This describes a set of experiments that
2 actually relates to the Internet2 discussion that we
3 had earlier. RMI stands for Remote Media Immersion.
4 And for several years there was -- I was a faculty
5 investigator and then eventually a deputy director 10:35:30
6 of the National Science Foundation Engineering
7 Research Center that was established at USC, and
8 this was one of the kind of capstone experiments
9 that we did to push the limits of multimedia at the
10 time. This was in the late 1990s. 10:35:47

11 And so this paper talks about what
12 technologies would you -- would one need and how
13 would we use them to deliver what appears like high
14 quality representation of reality to somebody that
15 is far away. 10:36:06

16 Q What was your contribution with respect to
17 this paper?

18 A So several parts. It was the algorithms for
19 capturing audio on one end. Algorithms for
20 delivering it on the other end. Those were, I would 10:36:32
21 say, individual contributions.

22 And then there were collaborative
23 contributions in working with the researchers and
24 computer networks to develop methods together that
25 met the requirements of multichannel audio, 10:36:48

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1 immersive audio, that were very different from the
2 requirements of sending faxes and e-mails in terms
3 of quality of service, forward error correction, and
4 other things like that.

5 Q Okay. And I want to look at PDF page 4, 10:37:12
6 Figure 1.

7 Do you see that?

8 A Yes.

9 Q Did you design this architecture shown in
10 Figure 1? 10:37:29

11 A This architecture is -- this is all
12 off-the-shelf equipment. It's computers and hard
13 disks and Ethernet switch and computers at the other
14 side. So this was not -- we discussed how to put
15 them together and all agreed that this is how we 10:37:58
16 would need to do it in order to achieve our goal.
17 But the individual pieces are off-the-shelf
18 components.

19 Q Okay. And, you know, I want to take a look
20 at the bottom of page -- PDF page 3 here, the last 10:38:12
21 paragraph. It says:

22 "Figure 1 (next page) shows the
23 server cluster architecture, which can
24 harness the resources of many nodes
25 and many disk drives per node 10:38:26

1 concurrently."

2 Then the last sentence on that page says:

3 "Each cluster node is attached to
4 a local network switch with a fast or
5 Gigabit Ethernet link. The nodes 10:38:41
6 communicate with each other and send
7 the media data via these network
8 connections. We connected the local
9 switch to both a wide area network
10 backbone to serve distant clients and 10:38:51
11 a local area network, LAN, environment
12 with local clients."

13 Do you see that?

14 A I do.

15 Q So looking at Figure 1, what are the cluster 10:39:05
16 nodes?

17 A What are in terms of --

18 Q What are the cluster nodes with respect to
19 Figure 1? Can you point to them or show me -- tell
20 me -- 10:39:28

21 A It's the ones that are labeled Node 0,
22 Node 1, Node 2, Node N. It was scalable.

23 Q What is a node?

24 A A node is I think a network -- people speak
25 for a connection of a device to the point of 10:39:53

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1 connection between a device like a computer or
2 server to the network.

3 Q And a local switch described in your
4 publication is the Ethernet switch shown in
5 Figure 1; is that right?

10:40:10

6 A Right.

7 Q And the internet showing here in Figure 1
8 represents the wide area network backbone described
9 in your publication; is that right?

10 A Correct.

10:40:22

11 Q Does Figure 1 also depict a local area
12 network environment with local clients?

13 A Well, the personal computers shown there are
14 on a local area network. The ones where the nodes
15 were indicated.

10:40:45

16 Q So the nodes here represent personal
17 computers; is that right?

18 A I think node is a term which -- it's the
19 device -- nodes to me represent connections, the
20 connection points. They happen to be parts of a
21 computer, an interface that the computer has to
22 create that node.

10:41:11

23 So I wouldn't -- the computer itself is not
24 the node. I think the fact that it has a connection
25 at that point makes -- creates a node as kind of an

10:41:31

1 entryway to that network.

2 Q I want to take a look at the bottom
3 paragraph, the left column of PDF page 4. The last
4 sentence says:

5 "VBR streams enhance the 10:41:54
6 rendering quality, but they generate
7 bursty traffic on a packet-switched
8 network such as the Internet. In
9 turn, this can easily lead to packet
10 loss due to congestion." 10:42:04

11 Do you see that?

12 A Yes.

13 Q Your publication here teaches that the
14 Internet is a packet network, correct?

15 A Yes. 10:42:14

16 Q Looking at the last sentence of the next
17 paragraph, it says:

18 "To avoid traffic bottlenecks,
19 each node transmits the data blocks
20 that it holds directly to the clients 10:42:29
21 via RTP. Hence, each client will
22 receive RTP data packets from each
23 server node within the cluster."

24 Do you see that?

25 A I do. 10:42:41

1 Q What is RTP?

2 A I think it's retransmission protocol. It's a
3 type of protocol that enables error correction. In
4 case there are lost packets, they are re-requested
5 before they're stitched back together to avoid 10:43:00
6 dropouts.

7 This was one of the big things we had to
8 worry about. You don't want audio dropouts. It
9 does not make for a high-quality experience.

10 Q Is RTP a type of internet protocol? 10:43:12

11 A No. I would say UDP is an internet protocol,
12 User Datagram Protocol, UDP is a type of internet
13 protocol. And you can enable, if you will, or
14 include in it a method like RTP that provides for
15 the ability to correct errors that happen because of 10:43:43
16 lost packets.

17 Q Does UDP require data to be transmitted or
18 received in the form of data packets?

19 A Yes.

20 Q So does RTP, right? 10:43:59

21 A RTP is -- it's not a transmission -- it's not
22 the same. Yes, RTP operates on packets to figure --
23 and requests retransmission of ones that are missing
24 based on what it was expecting, in simple terms.

25 Q Okay. So looking at Figure 1, the nodes 10:44:26

1 shown in Figure 1 transmit data packets over a wide
2 area network; is that correct?

3 A Well, they first go over a local area network
4 into the switch, and then the switch multiplexes
5 them all together and puts them onto the line that 10:44:55
6 goes to the wide area network, as shown at the top
7 through fast Ethernet or Gigabit Ethernet.

8 Q Sure. So let me correct that here.

9 So nodes communicate with the Ethernet switch
10 over a local area network, correct? 10:45:09

11 A Correct.

12 Q And these nodes send data packets to the
13 internet switch; is that correct?

14 A Yes. In this architecture, yes.

15 Q And in this architecture, the Ethernet switch 10:45:21
16 connects to the -- or communicates over the internet
17 and sends data packets over the internet; is that
18 correct?

19 A Right. Where it says "internet backbone
20 routers," those are -- exist -- there's a connection 10:45:39
21 in USC's IT building and that's -- so if we went
22 from there to that router, then that router then has
23 a direct line to the wide area internet. In this
24 case, it was Internet2. Not the general internet,
25 but a similar type of network. 10:45:58

1 Q Okay. I want to introduce Exhibit 5 here.
2 Give me one second.

3 Okay, I just uploaded Exhibit 5 and marked it
4 as Exhibit 5. Let me know when you see it.

5 A I see it. 10:46:21

6 (Exhibit 5 was marked for identification
7 electronically and is attached hereto.)

8 BY MR. PAK:

9 Q Do you recognize this document?

10 A Yes. It's one of my patents. 10:46:33

11 Q So you're a co-inventor of this patent,
12 correct?

13 A Yes.

14 Q And the patent number is 8,705,764, right?

15 A Yes. 10:46:47

16 Q At a high level, what does this patent
17 generally disclose?

18 MR. KAPLAN: Object to form.

19 THE WITNESS: We were trying to solve a
20 problem that happens when you take audio -- you 10:47:05
21 start with analog audio and then you digitize it
22 into a high quality digital form. And then in order
23 to store it perhaps on a portable device, one of
24 many different data compression algorithms are used.
25 MPEG being the most popular, but there are others 10:47:30

1 like AAC.

2 The result of that compression is that the
3 higher frequencies of sound that were in the
4 original tend to be discarded in the name of
5 bandwidth savings. And so this patent teaches a 10:47:44
6 method to recreate the lost high frequencies using
7 information that is in the lower frequencies that
8 did not get discarded.

9 BY MR. PAK:

10 Q I want to focus on Column 11. It's on PDF 10:48:04
11 page 21, lines -- lines 55 to 60. It's the last
12 sentence before the last paragraph.

13 Could you please read those lines for me for
14 the record.

15 A Is this the "Various embodiments" paragraph? 10:48:25

16 Q The sentence right above it.

17 A "The connectivity between the modules"? That
18 one?

19 Q Yes, that one.

20 A Okay.

21 "The connectivity between the
22 modules and/or components within the
23 modules may be provided using any one
24 of the connectivity methods and media
25 that is known in the art, including, 10:48:52

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1 but not limited to, communications
2 over the internet, wired or wireless
3 networks using the appropriate
4 protocols."

5 Q So it talks about communications over the 10:49:01
6 internet using the appropriate protocols. What are
7 the appropriate protocols communicated over the
8 internet?

9 A It's been a little while since I've seen
10 this, so just give me a second to take a look and 10:49:18
11 put it in context.

12 Q Sure. Go ahead, take your time.

13 A Yeah. Okay. It's all coming back.

14 Q Okay. So let me re-ask the question here.

15 What are the appropriate protocols to 10:50:17
16 communicate over the internet?

17 A It's what we talked about before. If it's
18 the internet as we have it today, it's TCP/IP or
19 peer-to-peer or UDP, as we just saw.

20 Q Are there any other protocols? 10:50:39

21 MR. KAPLAN: Object to form.

22 THE WITNESS: There are others. There's --
23 let's see. OSI is another one, Open System
24 Interfaces. There are probably others I'm not
25 remembering. There are a number of these internet 10:51:11

1 protocols.

2 To be clear, the patent is really not about
3 connecting -- it's just saying that the modules that
4 we're discussing here that are going to do advanced
5 audio processing don't necessarily have to be in one 10:51:30
6 device, they can be spread out, distributed. That
7 was the point of that paragraph.

8 BY MR. PAK:

9 Q What is the OSI protocol?

10 A It's a -- the best way to describe it, it's 10:51:48
11 an attempt at abstracting the individual layers that
12 are required in a network system all the way from
13 the hardware layer to the firmware to the software
14 that needs to run on top of it, to the physical
15 connections, in a way that provides a more uniform 10:52:16
16 way for people that are trying to send data over
17 these kinds of networks without having to know
18 exactly what type of device was there.

19 So it moves it up to be a more abstract
20 representation of the interface of the network. I 10:52:34
21 believe there are seven layers in it that -- in that
22 stack.

23 Q Does the data that is transmitted using the
24 OSI protocol require data packets, data transmitted
25 in the form of data packets? 10:53:01

1 A Yes, it's a packet-based system.

2 Q Okay. I want to look at Column 9, lines 20
3 to 24 of your patent. And I'm just paraphrasing
4 here, but it says that the output is characterized
5 by a transfer function. 10:53:27

6 Do you see that?

7 A I do.

8 Q What does the term "characterize" mean?

9 A In this context it means that -- so we're
10 talking about a system. A system has inputs and 10:53:43
11 outputs. And typically when you do system analysis,
12 you want to find a way to describe the output in
13 terms of the input signal.

14 And so the transfer function in this context
15 says that if I have -- if I know what the amplitude 10:53:58
16 level was to this box and I know what the transfer
17 function is, then I can tell you what the output is.

18 Q Do you know any words or phrases that are
19 synonymous with the term "characterize"?

20 MR. KAPLAN: Object to form. 10:54:17

21 THE WITNESS: I'm trying to think of it in
22 this context, and not just generally.

23 What it really means here is mathematically
24 described. Because we're talking about this
25 equation here. That would be the closest I can 10:54:41

1 think of.

2 BY MR. PAK:

3 Q Can you think of any other words or phrases
4 that are synonymous with "characterize"?

5 A Not off the top of my head, no. 10:54:53

6 Q But "describe" would be one of the terms that
7 is synonymous with "characterize," right?

8 MR. KAPLAN: Object to form.

9 THE WITNESS: Yeah, but I don't want to -- in
10 math we say mathematically described, so I would be 10:55:11
11 more comfortable keeping it that way.

12 BY MR. PAK:

13 Q What about defined?

14 MR. KAPLAN: Object to form.

15 THE WITNESS: Defined has a different meaning 10:55:24
16 to me. A definition in math or applied math means
17 that you're making some assumptions and defining
18 them. But that's not what is happening here.

19 This is a -- an equation that has certain
20 elements. And so the system is characterized by 10:55:47
21 this transfer function. So I think describe
22 mathematically is more accurate.

23 BY MR. PAK:

24 Q What if I say -- what if we change "the
25 output is characterized by a transfer function" to 10:56:04

1 "the output is represented by a transfer function,"
2 would that be accurate?

3 MR. KAPLAN: Object to form.

4 THE WITNESS: I don't think so because
5 "represented" to me means it's not the thing, but 10:56:23
6 it's being represented by something else. And
7 that's not technically correct here. This H
8 function is the function.

9 BY MR. PAK:

10 Q What if you say "the output indicates a 10:56:42
11 transfer function," would that be incorrect?

12 A No. That would be something completely
13 different and it would indicate that there might be
14 an output or something, but that's not -- this is a
15 deterministic system, and so no. 10:57:00

16 Q Well, looking at the equation here, the
17 output Y equals the transfer function times the
18 sinusoid input, S-I-N-U-S-O-I-D.

19 So the output function here indicates the
20 transfer function and the sinusoid input, right? 10:57:35

21 A No.

22 Q It provides some kind of indication of it?

23 A No, no. This is a way to calculate the
24 output function. So it is calculated by multiplying
25 the transfer function with the complex sinusoid. 10:57:53

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1 Q Okay. Let me try to introduce another
2 exhibit here.

3 I just uploaded a new exhibit and marked it
4 as Exhibit 6. Let me know when you see it.

5 A I see it. 10:58:25

6 (Exhibit 6 was marked for identification
7 electronically and is attached hereto.)

8 BY MR. PAK:

9 Q Do you recognize this document?

10 A Yes, it is another one of my publications. 10:58:35

11 Q The title of the publication is "High Quality
12 Multichannel Audio Over the Internet," right?

13 A Yes.

14 Q What was your contribution to this
15 publication? 10:58:51

16 A These are two students in the center. One of
17 them was in my group and the other one was in the
18 networking group. And this was a paper that --
19 similar to the previous one, it was trying to figure
20 out ways to transmit high quality audio over the 10:59:09
21 internet.

22 And the reason that it was an interesting
23 topic was that it was really not possible to
24 transmit high quality audio over the internet, at
25 least not in the early days. And so this paper 10:59:23

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1 shows some ways of doing that.

2 Q Let's take a look at the abstract. The
3 second sentence here says:

4 "We present a robust scalable
5 architecture for delivering 10:59:44
6 uncompressed multichannel audio over
7 high bandwidth ATM networks."

8 Do you see that?

9 A I do.

10 Q Is an ATM network a type of data network? 10:59:54

11 A Yes.

12 Q Is that because an ATM network carries data?

13 A Actually, I should revise it.

14 ATM network is a -- is a protocol for
15 transmitting data over data networks. It stands for 11:00:10
16 Asynchronous Transfer Mode, so it's a method of
17 transmitting data over networks, over data networks.

18 Q So an ATM network is not an actual network,
19 it's a protocol; is that right?

20 A Right. There's a -- there's a network 11:00:29
21 architecture that has connectors and switches and
22 things that have to support the ATM protocol in
23 order to have an ATM network of devices.

24 Q Okay. Looking at the abstract, it says:

25 "Performance results from our 11:00:52

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1 implementation on a high-speed local
2 area ATM network are presented that
3 identify the effects of audio packet
4 size, buffering, and network latency
5 on the quality of multichannel program 11:01:05
6 material."

7 Do you see that?

8 A I do.

9 Q So is a high-speed local area ATM network a
10 network protocol or a data network? 11:01:16

11 A No. This is -- this sentence is kind of
12 conflating to me. It's a local area network running
13 the ATM protocol for purposes of this experiment.

14 Q Got it.

15 A So it requires different hardware. A TCP 11:01:32
16 local area network would require a different
17 hardware than an ATM protocol local network.
18 Sometimes they can be in the same box, but usually
19 it's different.

20 Q So your publication here is talking about a 11:01:48
21 local area network that uses the ATM protocol; is
22 that correct?

23 A Right.

24 Q Did you design and implement the local area
25 network that uses this ATM network described in this 11:02:04

1 publication?

2 A If you look in Figure 1 of the next page,
3 this is a similar simpler diagram than -- compared
4 to the one that we saw before with the RMI network.

5 So we designed this architecture or this set 11:02:28
6 of components that are all off-the-shelf audio
7 parts, and you can see the ATM adapter inside the
8 computer that allows you to put out onto the network
9 data that follows the ATM protocol. And then
10 there's the playback application on the top. 11:02:54

11 So, yeah, we designed this architecture, but
12 it consists of computers and switches and wires that
13 are off the shelf and software that we put inside it
14 to do what we -- to run this experiment.

15 Q And when you say that "we designed," are you 11:03:09
16 saying that you designed the network described in
17 Figure 1, for example?

18 MR. KAPLAN: Object to the form.

19 THE WITNESS: The way collaborative papers
20 work is this is a group, you know, we have group 11:03:31
21 meetings. We designed the experiment and then have
22 regular kind of intervals of meeting and discussing.

23 So if you're asking who designed each
24 individual part, it's hard to say because we had
25 joint code sessions where we all sat in front of the 11:03:53

1 screens, do this, change that, let's try this
2 exercise. And so it's hard to break it up into an
3 individual.

4 BY MR. PAK:

5 Q Yeah, understood. 11:04:04

6 So how about maybe -- let's take a look at
7 the last page, PDF page 6, and there's an
8 acknowledgment section. It says:

9 "The authors would like to thank

10 Dr. Sherali Zeadally" -- 11:04:18

11 I might be botching that name.

12 A No, that's all right.

13 Q So let me read it again.

14 "The authors would like to thank

15 Dr. Sherali Zeadally for his work in 11:04:30

16 its design and implementation of the

17 ATM network."

18 Do you see that?

19 A I do.

20 Q So Dr. Zeadally is the one who actually 11:04:39

21 designed and implemented the local area network that
22 uses the ATM network described in this publication,
23 correct?

24 A Well, so he was a collaborator on this. The
25 second author in the paper was a joint student, so 11:04:54

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1 he was -- Mr. Zhu was Dr. Zeadally's student.

2 Dr. Zeadally's lab was doing experiments with ATM
3 networks, and they had the infrastructure that we
4 were looking for in terms of switches and the right
5 cables and so on. 11:05:17

6 So I think this is kind of -- because he
7 wasn't part of this particular experiment, he is not
8 a co-author, but we used his lab where he had kind
9 of a tabletop network for us to experiment with
10 these protocols. 11:05:34

11 Q Okay. I want to take a look at PDF page 3.
12 And there's a header 3 that says, "Experimental
13 Results".

14 A Yes.

15 Q Could you read the first two sentences under 11:05:51
16 that header?

17 A Yes.

18 "In order to assess the effects
19 of packet size and buffer size on the
20 quality of the audio streams 11:06:01
21 transmitted through the network, as
22 well as on the delay introduced by the
23 system, we performed a series of
24 tests."

25 The next one as well? 11:06:13

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1 Q You know, that's fine.

2 A Okay.

3 Q So this publication discloses a system
4 architecture in which data packets are transmitted
5 over a local area network that uses the ATM 11:06:25
6 protocol; is that correct?

7 A Well, this publication was not intended to
8 disclose the architecture. It was more intended to
9 use the architecture to experiment with what needs
10 to be changed or fixed or, you know, what matters in 11:06:39
11 high-quality audio transmission over a network that
12 has the bandwidth and the architecture that could
13 enable it. We just didn't know what the right
14 architecture was for transmitting audio in terms of
15 the buffer size and packet sizes, and so on. 11:06:56

16 So it was more of an experimental paper that
17 uses a network architecture based on the ATM system
18 that was kind of local to us there so we could
19 change things in it.

20 Q All right. So the publication describes a 11:07:09
21 local area network that uses the ATM protocol to
22 transmit data packets, right?

23 MR. KAPLAN: Object to form.

24 THE WITNESS: The publication describes an
25 experiment that was conducted on the system we just 11:07:24

1 described.

2 BY MR. PAK:

3 Q Can you send data over a local area network
4 using the ATM protocol in the form of data that is
5 not a data packet?

11:07:51

6 A No. The ATM protocol is a packet-based
7 protocol.

8 Q Okay. I want to introduce another exhibit
9 here, so just give me a minute.

10 Okay. I just introduced Exhibit 7. Let me
11 know when you see it.

11:08:45

12 A I see it.

13 (Exhibit 7 was marked for identification
14 electronically and is attached hereto.)

15 BY MR. PAK:

11:08:51

16 Q Do you recognize this document?

17 A Yes.

18 Q At a high level, what does this publication
19 describe?

20 MR. KAPLAN: Object to form.

11:08:58

21 THE WITNESS: I don't know if this was an
22 actual publication. This was more of an internal --
23 more kind of like a white paper. I don't remember
24 the origin of it. It could be part of a report that
25 was presented to the annual review by the National

11:09:14

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1 Science Foundation.

2 It's related to an experiment that we did
3 with the New World Symphony based in Miami. And it
4 was similar to the RMI experiment trying to --
5 trying to deliver high-quality performance that is 11:09:57
6 convincing you to feel like you're in the concert
7 hall with them, even though you are 3,000 to 4,000
8 miles away.

9 We actually demonstrated this live to an
10 audience of several hundred people. It was the 11:10:10
11 first time that it had ever been done at that scale.

12 BY MR. PAK:

13 Q This publication talks about HYDRA. It's
14 abbreviation for high resolution live streaming.
15 What is HYDRA? 11:10:26

16 A So HYDRA was -- Professor Zimmerman that you
17 see there at the top, his laboratory and his
18 research group was experimenting with using similar
19 things that we talked about before using the UDP
20 protocol with error correction to deliver 11:10:52
21 high-quality content and overcome the problems that
22 normally arise with traditional ways of doing that,
23 for example, TCP, which were not designed for
24 streaming media. They were designed for offline --
25 it's okay if you can wait a second before you get 11:11:13

1 your e-mail, but you can't wait to get the next
2 audio packet, right? So that's what HYDRA is. It
3 was trying to do that.

4 Q Okay. And I want to take a look at the
5 second section, the Statement of Project Goals. And 11:11:27
6 in the middle of that section, the publication says:

7 "This project focuses on the
8 design of a system that enables HD
9 quality video and multiple channels of
10 audio to be streamed across an 11:11:43
11 IP-based network with commodity
12 equipment."

13 Do you see that?

14 A Sorry. The middle section -- I missed where
15 you pointed. 11:11:52

16 Q Yeah. So in the middle of Section 2,
17 Statement of Project Goals --

18 A Oh, yes. I see it.

19 Q Okay. What is an IP-based network as
20 described in this publication? 11:12:06

21 A It's an internet protocol based network,
22 which is kind of a very common type of protocol for
23 transmitting data over the internet.

24 Q Okay. And the second page here, Section 4,
25 the second to last paragraph -- second sentence -- 11:12:30

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1 second to last sentence in the first paragraph, it
2 says:

3 "The transmission subsystem uses
4 the Realtime Transport Protocol, RTP,
5 on top of the Universal Datagram 11:12:45
6 Protocol, UDP."

7 Do you see that?

8 A Yes.

9 Q So this publication is talking about an
10 IP-based network that uses UDP; is that right? 11:12:55

11 A That's right. Those are subsets of an
12 IP-type network, just as TCP is.

13 Q I want to take a look at the system
14 architecture shown on Figure 1 of that page.

15 A Yes. 11:13:14

16 Q Do you see the stream transmitter/receiver in
17 the figure?

18 A Yes.

19 Q What does the stream transmitter/receiver do?

20 A That's -- that's a piece of software that's 11:13:25
21 kind of like the core of the HYDRA system. It takes
22 in multiple channels of microphones in this example
23 of a live recording, multiple cameras, and kind of
24 packages them together to send over the network by
25 paying attention to things that we talked about 11:14:03

1 before, error correction and other things.

2 Q What is the form of data that is transmitted
3 or received over the IP-based network disclosed in
4 this system architecture?

5 A Well, it's what it says on the line above RTP 11:14:19
6 over UDP.

7 Q Right. So this system architecture is
8 designed to transmit or receive data packets, right?

9 A Well, it's using an existing network that is
10 based on data packets. 11:14:38

11 So we had to take the data that is coming in
12 in different forms, audio and video, and convert it
13 to match what the network expects, in this case,
14 data packets.

15 Q Okay. I want to introduce another exhibit 11:14:53
16 here. Just give me one minute.

17 Okay, I just uploaded a new exhibit and
18 marked it as Exhibit 8.

19 (Exhibit 8 was marked for identification
20 electronically and is attached hereto.) 11:15:27

21 BY MR. PAK:

22 Q Let me know when you see it.

23 A I see it.

24 Q Do you recognize this document?

25 A Yes. 11:15:39

1 Q This is another one of your publications,
2 correct?

3 A Yes.

4 Q What does this publication describe?

5 MR. KAPLAN: Object to form. 11:15:51

6 THE WITNESS: This is another one of the same
7 kind of sequence of experiments we've been
8 discussing, which is high fidelity picture and sound
9 transmitted in a synchronized way over the Internet2
10 in this case. This particular one was trying to 11:16:08
11 understand what happens when you have an interactive
12 section.

13 So it's one way to stream in one direction to
14 an audience far away. It's another way when you
15 need to have two-way communication. Because in this 11:16:27
16 example, we had two musicians and they are supposed
17 to play a piano piece together, each on their own
18 piano. And musicians require, of course, very
19 accurate timing between them in order to perform.

20 So by adjusting -- artificially adjusting the 11:16:44
21 delay between the two of them is what -- how they
22 would hear the other side. And we were looking for
23 what the limits are of human performance over
24 networks.

25 ////

1 BY MR. PAK:

2 Q I want to take a look at the first paragraph
3 on the right column of page 1. After the first
4 sentence, it says:

5 "Network latency is an
6 unavoidable fact of interaction
7 environments over the Internet."

8 Do you see that?

9 A Yes.

10 Q What is network latency? 11:17:22

11 A It's the amount of time it takes for
12 information that was sent from one side of the
13 network and how long it takes to be received at the
14 other side. It is not instantaneous and it depends
15 on distance usually. That's what we call latency. 11:17:39

16 Q Why is network latency an unavoidable fact of
17 the interaction environments over the internet?

18 A Because of the protocols that are in place
19 that have been created to ensure, for example, that
20 data isn't lost. Sometimes that takes longer to 11:18:04
21 make sure that it's all collected before it's
22 presented to the other side. That's one reason.

23 The other reason is every time you go -- it's
24 not a direct connection between two distant places.
25 You go through switches on the network. And so 11:18:22

1 switches also, as they pass the data through,
2 introduce delay in order again to avoid -- because
3 they're doing something to make sure not to lose
4 anything. So the connection of all these boxes
5 introduces some delay. 11:18:37

6 It's not that dissimilar from an analog
7 network over long distances. Audio doesn't travel
8 at the speed of light. The longer the cable is --
9 it has to be pretty long, but you see delays in
10 analog circuits as well. 11:18:53

11 Q When you say "switches" on a network, are you
12 talking about packetized -- packet-based network
13 switches?

14 A In this case we're talking about the
15 internet, so that is a packet-based system, yes. 11:19:06

16 Q Okay. And the bottom of PDF page 1 under
17 subsection "Low Latency Audio," it says:

18 "The challenges in transmitting
19 audio over the internet are packet
20 loss and fluctuations in transmission 11:19:24
21 time."

22 So, you know, is packet loss, you know,
23 inevitable in a system that communicates over the
24 internet?

25 MR. KAPLAN: Object to form. 11:19:42

1 THE WITNESS: Inevitable? There are ways to
2 mitigate it, and trade-offs. So you could make it
3 not happen at all. If you were okay incurring more
4 latency, just wait longer for everything to arrive.
5 But that's the trade-off. So in a realtime system 11:19:59
6 where you don't have the luxury of waiting, they are
7 inevitable in that sense, yes.

8 BY MR. PAK:

9 Q Okay. But when we talk about devices that
10 communicate over the internet, we're talking about 11:20:20
11 devices that send or receive data in the form of
12 data packets, right?

13 A Well, in that diagram, the two end devices,
14 the one at Diagram 1 we were talking about, is
15 that -- I'm sorry. That was in the previous 11:20:38
16 example? Yes, it was. Let's see if it's here as
17 well.

18 The devices that connect to the internet,
19 let's say the computer that connects to the internet
20 on the sending side takes in analog data from the 11:20:53
21 real world, converts it first to digital, and then
22 it has to convert it to a form -- you know, if we're
23 doing this experiment over a different kind of
24 network, we'd have to convert to whatever that
25 network expected. 11:21:11

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1 In this case, because this was an Internet2
2 experiment, we had to convert it to the UDP style --
3 the IP-type packet based form so that we could use
4 that network.

5 And then the opposite procedure happens at 11:21:23
6 the other end. We can't experience packets. We can
7 experience picture and sound. So we have to convert
8 it back.

9 Q So once data is converted from analog to
10 digital and sent over the internet, that data has to 11:21:35
11 take the form of packets; is that right?

12 A If we're going to use an internet -- existing
13 internet infrastructure, yes.

14 Q Okay. I want to take a look at Figure 1
15 shown on PDF page 2. 11:22:02

16 A Okay.

17 Q And the top of Figure 1 says:

18 "Data sources produce packetized
19 realtime data streams."

20 Do you see that? 11:22:16

21 A Yes.

22 Q What are the data sources in Figure 1?

23 A All kinds of multimedia capturing devices.

24 Camera, microphones -- cameras, microphones, in this

25 case haptic sensors. 11:22:38

1 Q So data from these data sources are
2 first converted to digital form, right, and then
3 sent in packets over the internet; is that correct?

4 MR. KAPLAN: Object to form.

5 THE WITNESS: Yes. Yes. That's what those 11:23:08
6 little rectangles are trying to indicate, that data
7 has been packetized in realtime using RTP, as it
8 says there.

9 BY MR. PAK:

10 Q Okay. You know, I'm going to start 11:23:26
11 transitioning over to discussing your declaration.
12 So why don't we take a ten-minute break.

13 Is that okay?

14 A Sure.

15 THE VIDEOGRAPHER: Off the record at 11:23:34
16 11:23 a.m.

17 (Recess.)

18 THE VIDEOGRAPHER: We are on the record at
19 11:36 a.m.

20 BY MR. PAK: 11:36:18

21 Q Dr. K., you submitted a declaration on
22 June 1, 2021, for this matter between Sonos and
23 Google, correct?

24 A Correct.

25 Q You were retained as an expert to offer 11:36:35

1 opinions on claim construction related to the
2 asserted patents in this case, right?

3 A Yes.

4 Q When were you contacted to offer your
5 opinions for claim construction related to the 11:36:46
6 asserted patents?

7 MR. KAPLAN: Object to form.

8 THE WITNESS: Specific to claim construction,
9 the discussions probably started a month ago, I'm
10 guessing. 11:37:01

11 BY MR. PAK:

12 Q So you were -- were you first contacted to
13 offer opinions on claim construction in May; is that
14 correct?

15 MR. KAPLAN: Object to form. 11:37:13

16 THE WITNESS: Again, I don't have the dates
17 in my head. It was after I was retained for the
18 case, obviously, but sounds about right. It could
19 have been in April.

20 BY MR. PAK: 11:37:26

21 Q Okay. Were you informed of what each party's
22 construction was at the time?

23 A At the time -- I was eventually, but not at
24 the time, no.

25 Q What did you do to prepare for your 11:37:45

1 declaration?

2 A I read the patents. I read through the
3 patent office -- office actions. Some of the prior
4 art. That's basically it. And then used knowledge,
5 my experience in the field to help form my opinions. 11:38:12

6 Q Did you consider the cited references in
7 the -- did you consider the cited references in the
8 office actions?

9 A Oh, the office actions.

10 I'm trying to remember. I read through a lot 11:38:36
11 of documents. I don't know if that -- for sure. I
12 tried to be as complete as possible. I don't know
13 if I did or not. Probably.

14 Q Do you understand that Sonos's experts,
15 Dr. Almeroth and Dr. Schmidt, submitted declarations 11:38:59
16 on claim construction in this case?

17 A Yes.

18 Q Did you read Dr. Almeroth's declaration?

19 A I did.

20 Q Did you read Dr. Schmidt's declaration? 11:39:14

21 A I believe I did.

22 MR. PAK: And, you know, just for the record,
23 I just noted Dr. Schmidt is actually on this Zoom
24 call. So I just wanted to point that out. I think
25 he joined a little bit late, but he is just here for 11:39:37

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1 observation purposes.

2 BY MR. PAK:

3 Q Did you consider any other material to
4 prepare your declaration?

5 A Other than what I mentioned, no. 11:39:51

6 Q All right. I'd like to introduce your
7 declaration here now as Exhibit 9. I marked it as
8 Exhibit 9 and uploaded it. So just let me know when
9 you see it.

10 A I see it. I just wanted to ask you a 11:40:36
11 question. I have a clean copy of the -- from the 28
12 pages of the part that I wrote on my desk.

13 Sometimes it's easier to go to a page that way than
14 it is -- if that's okay with you, I have it right
15 here. It's not marked. It's just a clean printout. 11:40:49

16 (Exhibit 9 was marked for identification
17 electronically and is attached hereto.)

18 BY MR. PAK:

19 Q Yeah, that's okay.

20 Can you look at the last page of your 11:40:53
21 declaration or PDF page 28 of Exhibit 9.

22 A Yes.

23 Q Is that your signature?

24 A It's my electronic signature, yes.

25 Q I forgot to ask you, is this a true and 11:41:17

1 correct -- true and accurate copy of your
2 declaration submitted June 1, 2021?

3 A Yes, it is.

4 Q Okay. And the opinions set forth in this
5 declaration are yours, correct? 11:41:32

6 A Yes.

7 Q To date, this is the only declaration that
8 you submitted in this case, correct?

9 A That's right.

10 Q Your declaration is as accurate and complete 11:41:42
11 as you could reasonably make it, correct?

12 A Yes. There's a minor copy and paste problem
13 that happened that I saw last night, but other than
14 that, yes.

15 Q Okay. And where is that copy and paste 11:42:02
16 error?

17 A It's on page 13. Claim terms. Part A is
18 zone configuration and part B should be just group
19 configuration. But initially I had them both
20 together in one table and then I split it up. So B 11:42:26
21 should be just group. That's it.

22 Q Is that the only error you see in your
23 declaration?

24 A That's all I saw, yes.

25 Q So let's walk through your declaration. 11:42:42

1 Section 2, paragraphs 8 through 13, sets
2 forth your qualification as an expert, correct?

3 A Yes.

4 Q And Section 3, paragraphs 14 to 22, sets
5 forth your understanding of various legal standards 11:43:00
6 related to claim construction; is that fair?

7 A That's correct.

8 Q In reaching your opinions set forth in your
9 declaration, did you apply the legal standards set
10 forth in Section 3? 11:43:16

11 A Yes. To the best of my ability, I did.

12 Q Okay. Section 4, paragraphs 23 to 29, sets
13 forth your overview of the asserted patents,
14 correct?

15 A Yes. 11:43:30

16 Q Subsection A -- in subsection A, you provide
17 an overview of what you call the direct play
18 patents, correct?

19 A Yes.

20 Q According to subsection A, the direct play 11:43:50
21 patents share a common specification, correct?

22 A Yes.

23 Q At subsection B you provide an overview of
24 what you call the zone scene patents, correct?

25 A Right. 11:44:14

1 Q According to this section, the zone scene
2 patents include the '206, '966, and '855 patents,
3 correct?

4 A Yes. I just want to point out these names
5 were provided to me and I believe they were -- these 11:44:31
6 are the Sonos designations. I'm not a hundred
7 percent that's -- the groupings of the patents were
8 provided this way.

9 Q When I -- if I refer to certain patents as
10 direct play patents or zone scene patents, you 11:44:46
11 understand what I mean by those terms?

12 A Yes.

13 Q Okay.

14 A I do.

15 Q According to subsection B, the '206 patent 11:44:52
16 specification is substantially the same as the '966
17 and the '855 patent specifications, correct?

18 A Yes.

19 Q Okay. Moving on to section 5, paragraphs 30
20 to 34, those paragraphs set forth your opinions 11:45:14
21 regarding the level of ordinary skill in the art,
22 correct?

23 A Correct.

24 Q Then Section 6, paragraphs 35 and 36, sets
25 forth your understanding of the asserted claims in 11:45:28

1 this matter, correct?

2 A Right.

3 Q Section 7, paragraphs 37 all the way through
4 the end to paragraph 76, sets forth your analysis
5 regarding some of the parties' disputed claim 11:45:48
6 construction terms in this matter, correct?

7 A Yes.

8 Q And specifically paragraphs 37 to 48 provide
9 your analysis regarding the terms "zone
10 configuration" and "group configuration," correct? 11:46:02

11 A Correct.

12 Q Paragraphs 39 through 53 provide your
13 analysis regarding the term "local area network,"
14 correct?

15 A 39? 11:46:18

16 Q Go ahead. Sorry. Let me repeat that.

17 Paragraphs 49 through 53 provide your
18 analysis regarding the term "local area network,"
19 correct?

20 A Yes. 11:46:38

21 Q And paragraphs 54 to 59 provide your analysis
22 regarding the term of "media particular playback
23 system," correct?

24 A Yes.

25 Q Paragraph 60 to 73 provide your analysis 11:46:59

1 regarding the term "data network," correct?

2 A Correct.

3 Q And, lastly, paragraphs 74 to 76 provide your
4 analysis regarding the term "wherein the instruction
5 comprises the instruction," correct? 11:47:18

6 A Right.

7 Q So we just walked through your declaration
8 here. Do you have any other changes besides that
9 copy and paste error that you would like to make to
10 your declaration? 11:47:33

11 A No.

12 Q So how about we jump to paragraph 24. It's
13 on page 9 of your declaration.

14 A Okay.

15 Q Okay. Paragraph 4 -- paragraph 24 says: 11:47:54

16 "Each of the zone scene patents
17 originated with U.S. provisional
18 application number 60/825,407, which
19 was filed on September 12, 2006."

20 Do you see that? 11:48:14

21 A Yes.

22 Q Now, let's take a look at paragraph 28 on the
23 next page.

24 A I see it.

25 Q Actually, if you go to the bottom of page 11, 11:48:33

1 it says:

2 "In my experience, at the time
3 the Zone Scene patents were filed,
4 multi-zone audio systems existed from
5 a variety of manufactures, such as 11:48:45
6 Bose, Crestron, and others."

7 Do you see that?

8 A Yes.

9 Q Do you know any specific conventional
10 multi-zone audio systems that existed at the time 11:48:58
11 the zone scene patents were filed?

12 A Are you saying other than the ones I listed
13 here?

14 Q Well, you've listed manufacturers, right?
15 But do you know any actual product names or model 11:49:11
16 numbers?

17 A Oh, product names. Let's see if I can recall
18 any.

19 The Bose one I think was called a Lifestyle.
20 I'd have to look it up. 11:49:28

21 Crestron -- Crestron makes hardware and
22 software for multi-room installations, whether it's
23 board rooms or homes. I don't know if they have a
24 specific product name. But normally there's others.

25 A lot of the home theater receiver manufacturers, 11:49:55

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1 such as Denon -- I know that one because that was
2 the first product that Audyssey went into when we
3 first started. It was the AVR5805, and many others
4 after that. They all provide connectors and
5 mechanism to have multiple zones of audio in your 11:50:19
6 home.

7 Initially there was two and eventually more
8 than two, perhaps three or four. Yamaha, Marantz,
9 Onkyo, many of those had those.

10 Q Have you ever used a Bose Lifestyle system? 11:50:40

11 A I have, yes.

12 Q Do you know -- do you know which Bose
13 Lifestyle system you used?

14 A It's been so many years, so I don't remember
15 the model number. 11:51:08

16 Q Does the Bose Lifestyle 50, does that ring a
17 bell?

18 A Possibly, but I don't remember.

19 Again, this was one of the situations where
20 we brought it into the testing lab at Audyssey just 11:51:25
21 to look at things. So paid less attention to the
22 model number than what it could do.

23 Q Do you recall how the Bose Lifestyle system
24 operates?

25 A At a high level, sure, yes. 11:51:41

1 Q Could you please describe how the Bose
2 Lifestyle system operates?

3 A It has the main -- I guess I would call it a
4 processing box where you connect your audio sources.
5 So it acts as a source selector. That box provides 11:52:03
6 outputs that go to amplifiers in it as well and
7 provides outputs that interconnect the loudspeakers.
8 In that case I believe it was a 5.1 surround system.
9 And it has an additional -- I don't know what they
10 call it -- breakout box that allows you to extend to 11:52:22
11 a different room and still be controlled by the main
12 controller. And also it had a remote control.

13 Q How do the loudspeakers interconnecting to
14 that central box communicate with the controller,
15 the remote controller? 11:52:51

16 A The remote controller sends signals over a
17 wireless link to the main box, I guess main
18 processor. And then it tells, you know, what each
19 speaker should be playing over the wired
20 connections. 11:53:18

21 Q Do the loudspeakers connected to the central
22 box communicate with one another?

23 A With one another? No. The central processor
24 decides what to send to each one.

25 Q In the Bose Lifestyle system can you 11:53:40

1 synchronize the loudspeakers to play audio in
2 synchrony?

3 A Yes.

4 Q How does the Bose Lifestyle accomplish that?

5 A That's a Bose method inside their own 11:54:05
6 processor. Let's just say it wouldn't be a very
7 successful product if they played out of synchrony.
8 It would be a terrible audio system.

9 Q Right. But the loudspeakers don't
10 communicate with each other, right? So how do they 11:54:25
11 coordinate with one another to play audio in
12 synchrony?

13 A Because the central processor that is
14 deciding what to send, what signal stream to send to
15 each one makes sure that they are transmitted over 11:54:38
16 each connection in the required synchrony.

17 Q When you say "the central processor," you're
18 talking about the central device that interconnects
19 the loudspeakers, correct?

20 A Right. That has a processor in it and it's 11:54:58
21 responsible for a number of things, simple things
22 like adjusting volume in response to commands that
23 it receives. Perhaps decoding audio formats from
24 the sources that are coming in. And then
25 distributing the audio over the interconnect. 11:55:16

1 Q So the loudspeakers communicate with the
2 central processor, right, but they don't communicate
3 with one another directly, correct?

4 MR. KAPLAN: Object to form.

5 THE WITNESS: The loudspeakers receive data 11:55:35
6 from the central processor, but they don't
7 communicate with each other.

8 BY MR. PAK:

9 Q Okay. So what -- what cables are required to
10 interconnect the loud speakers to the central box or 11:55:57
11 the central processor of the Bose Lifestyle system?

12 A These are provided by Bose. They are copper
13 cables and they have RCA-type connections at the end
14 of each side of the cable.

15 Q Do you know if the Bose Lifestyle system can 11:56:31
16 communicate over Wi-Fi?

17 A I'm sure they have models that can. That
18 particular one I don't think did.

19 Q So the loudspeakers are internet connected to
20 the central processor or central box, right? What 11:56:59
21 is the form of data that is transmitted between the
22 loud speaker and the central processor?

23 MR. KAPLAN: Object to form.

24 THE WITNESS: It's analog audio data.

25 /////

1 BY MR. PAK:

2 Q Does it have to be analog audio data?

3 MR. KAPLAN: Object to form.

4 THE WITNESS: In general or in that product?

5 BY MR. PAK:

6 Q In that product. In that product when a
7 loudspeaker communicates to the central processor or
8 the central box, does it send analog data or digital
9 data?

10 A It sends analog data because the amplifiers 11:57:42
11 are inside that same box where the processor is. So
12 the output of the amplifier is using analog audio
13 signals sent to each speaker.

14 Q So in that product, in that Bose Lifestyle
15 system, the loudspeakers are not sending data 11:57:59
16 packets to that central processor, correct?

17 MR. KAPLAN: Object to form.

18 BY MR. PAK:

19 Q Sorry. Did you say "correct"?

20 A Yes, correct. 11:58:17

21 Q Okay. Do you know if the Bose Lifestyle
22 system communicated over a local area network?

23 A Communicated with what?

24 Q Do you know if the loudspeakers
25 interconnected to the central processor could 11:58:38

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1 communicate over a local area network?

2 A Based on what I said this morning, that is a
3 local area network. It's analog data going to --
4 being carried over copper wires to end devices.

5 Q Okay. And this Bose Lifestyle system was 11:59:06
6 unable to -- incapable of communicating over the
7 internet; is that right?

8 MR. KAPLAN: Object to form.

9 THE WITNESS: Because I don't remember the
10 model, I'm not sure if this -- if you could stream 11:59:35
11 to it. It could connect to a number of sources. I
12 just don't recall if one of them could be a wireless
13 source.

14 BY MR. PAK:

15 Q Do you know when you used this Bose Lifestyle 11:59:52
16 system?

17 A Probably seven or eight years ago.

18 Q So sometime in 2013, 2012 you used this Bose
19 Lifestyle system?

20 MR. KAPLAN: Object to form. 12:00:13

21 THE WITNESS: To the best of my recollection.

22 BY MR. PAK:

23 Q Do you know when this Bose Lifestyle system
24 was released?

25 MR. KAPLAN: Object to form. 12:00:23

1 THE WITNESS: I know that their Lifestyle
2 series was released well before that. I just -- and
3 they have more than one model. So that was probably
4 current at the time when we looked at it, but I
5 don't know. 12:00:42

6 BY MR. PAK:

7 Q But this is the model of Bose Lifestyle
8 system that included a remote control, you said; is
9 that right?

10 A Yes. 12:00:50

11 Q Could you describe what this remote control
12 did in the Bose Lifestyle system?

13 A The obvious things. Selecting the source --
14 again, this is a bit of a long time ago, but I think
15 it was change the volume and select the room. I 12:01:14
16 think they call it multi-room in the manual or in
17 the Bose language. So select which room you want
18 the music to play in or if it was all rooms.

19 That's my basic recollection. There might
20 have been other things too, but I just don't 12:01:42
21 remember.

22 Q Do you know what the Bose Lifestyle system
23 remote control looked like? Like what shape it
24 might have been in?

25 MR. KAPLAN: Object to form. 12:02:01

1 THE WITNESS: It had a screen -- it had a
2 screen in front of it. It might have been
3 rectangular or oval. I'm stretching my memory.

4 BY MR. PAK:

5 Q I understand. I know it's 17 years ago. I 12:02:21
6 was just curious.

7 I want to move to paragraph 31 of your
8 declaration. It's talking about the level of
9 ordinary skill in the art. Could you please read
10 paragraph 31 of your declaration. 12:02:32

11 A Yes.

12 "In my opinion, a person of
13 ordinary skill in the art at this time
14 would have had a bachelor's of science
15 in electrical engineering, computer 12:02:42
16 science or engineering, or a related
17 field, and two to four years of work
18 or research experience in the field of
19 information networks, data
20 communications or multimedia systems, 12:02:52
21 or a master's degree and one to two
22 years of experience in the same
23 field."

24 Q Does that mean a person of ordinary skill in
25 the art can be someone with a master's degree in any 12:03:02

1 field and one to two years of experience in the
2 fields of information networks, data communications,
3 or multimedia systems?

4 A No. What I meant is a master's degree in the
5 areas that I listed for the bachelor's. 12:03:19

6 Q Okay. So what you -- what you meant was a
7 master's degree in electrical engineering, computer
8 science, or engineering, and one to two years of
9 experience in the fields of information networks,
10 data communications, or multimedia systems; is that 12:03:34
11 right?

12 A Correct.

13 Q Okay. So as it is written right now in
14 paragraph 31, the way it's written is incorrect,
15 right? 12:03:47

16 MR. KAPLAN: Object to form.

17 THE WITNESS: Well, I don't know if it's
18 incorrect. I mean, I didn't want to repeat. I know
19 that's probably customary in legal documents, but I
20 thought it was obvious that it was referring to for 12:04:02
21 bachelor's, you get your master's in the same
22 fields.

23 BY MR. PAK:

24 Q And what are information networks?

25 A We've talked about all kinds of examples 12:04:14

1 today, but basically data networks. It's -- I guess
2 in -- at least at USC, I think the -- it's an area
3 that is studied called information networks. So I
4 think it's just different terminology for data
5 networks. 12:04:42

6 Q Are you using the term "information networks"
7 to be synonymous with "data networks"?

8 A In this paragraph, yes.

9 Q So an information network is any type of
10 media that carries data, right? 12:05:00

11 A Well, I don't know if it's -- like if you go
12 to a network engineer and ask them what an
13 information network is, that's the answer you would
14 get. This is more of an academic field that I was
15 referring to just because I know there are courses 12:05:17
16 listed that way.

17 So I don't know if it's a physical thing. I
18 was just referring to it as a field of study.

19 Q What does the field of data communications
20 include? 12:05:33

21 A Protocols for communication for exchanging
22 data. Error correction, anything to do with
23 handling of data, analog or digital.

24 Q What are multimedia systems?

25 A Multimedia systems are generally considered 12:06:01

1 processing systems with processing that can handle
2 multiple types of media, such as pictures, video,
3 audio, voice, text, haptics, all the ones that we
4 talked about earlier.

5 Q What about an audio system that only renders 12:06:38
6 audio, is that a multimedia system?

7 A An audio system that can't handle anything
8 else?

9 Q Yes.

10 A No. I would say no. Multi in multimedia 12:06:53
11 requires more than one.

12 Q So if a person has a -- sorry, I didn't mean
13 to cut you off.

14 A I'm fine. I'm done.

15 Q If a person has a bachelor's of science in 12:07:06
16 electrical engineering and only has experience in
17 audio systems that only render audio, but not any
18 other type of media, then that person would not
19 qualify as a person of ordinary skill in the art,
20 correct?

21 A No, I don't agree. I think if somebody has
22 studied multimedia systems as part of their field of
23 study, they have also studied audio and other
24 things. So if you have taken courses in multimedia
25 systems, you certainly have taken courses in just 12:07:49

1 audio, similar to the ones that I teach, or just
2 speech like my colleagues teach, or just video, and
3 also the integration of them. So it comes with
4 everything.

5 Q You know Sonos is a speaker company, right? 12:08:00

6 A Yes.

7 MR. KAPLAN: Object to form.

8 BY MR. PAK:

9 Q So if a person who works at Sonos has a
10 bachelor's of science in electrical engineering and 12:08:14
11 has experience in working on speaker systems that
12 render audio but don't render video or any other
13 type of media, does that person still qualify as a
14 person of ordinary skill in the art?

15 A That's kind of a hypothetical question. I'd 12:08:39
16 have to meet that person and find out what their
17 experience was to really answer that. I don't know
18 what courses they took or what experience they had
19 prior to Sonos.

20 Q What I'm trying to get at here is the word 12:08:47
21 "multimedia systems." You know, it seems like in
22 order to have experience in multimedia systems,
23 right, you need to -- you need a person that studied
24 a systems that render multiple types of media,
25 according to your definition, right? 12:09:16

1 A Right. But not just renders. All aspects --
2 multimedia systems represent systems that deal with
3 the integration, whether it's on the capture side,
4 compression, streaming of these integrated media
5 types. 12:09:47

6 But in order to study that, you do have to
7 study each individual one as well. This is not
8 just -- all components have to be studied
9 individually as well. And I assume somebody with
10 that kind of degree -- just based on the degrees we 12:10:00
11 have at USC, I can say that that's for sure the
12 case.

13 Q What are -- what are some examples of
14 multimedia?

15 MR. KAPLAN: Object to form. 12:10:15

16 BY MR. PAK:

17 Q Or let me phrase it differently.

18 What types of media -- what are some examples
19 of media types that would be categorized as
20 multimedia? 12:10:28

21 A Okay. So we're talking about media, not
22 systems, right?

23 Q Yes.

24 A You know, some obvious ones are television
25 programs, picture and sound, and graphics many 12:10:39

1 times. Computer games. More boring ones like
2 PowerPoint presentations with audio or video
3 embedded in them. Anything that has more than two
4 media. Or two or more, I should say.

5 Q Is a multimedia system that can render two or 12:11:11
6 more types of media other than audio, would that
7 qualify as a multimedia system?

8 A Sure.

9 Q So if a person has experience in implementing
10 and designing multimedia systems that don't render 12:11:38
11 audio but other types of media, is it your opinion
12 that that person would qualify as a person of
13 ordinary skill in the art?

14 A I'm sorry. Could you repeat that one more
15 time? 12:11:50

16 Q Yeah. So if a person has experience in
17 implementing or designing a multimedia system that
18 doesn't render audio but renders other types of
19 media, is it your opinion that that person would
20 qualify as a person of ordinary skill in the art? 12:12:04

21 A My assumption -- what I was trying to say
22 here was that this person has studied multimedia
23 systems. Whether they're designing now or not is
24 different. But if they studied multimedia systems,
25 then they certainly studied audio, voice, graphics 12:12:22

1 and text and others, perhaps, depending on the
2 program. So they've certainly had experience.

3 Q Okay. So you're assuming that if a person
4 has experience in multimedia systems, that person
5 would have experience in other types of media, 12:12:43
6 whether that's video, audio, or images, that person
7 would have experience in all of those different
8 types of media, correct?

9 A Correct. I wouldn't call them "other." I
10 would call them components of multimedia. 12:12:56

11 Q Okay. Let's take a look at paragraph 62 of
12 your declaration.

13 A Yes.

14 Q Would you please read that paragraph for me,
15 just the first two sentences. 12:13:28

16 A
17 "Numerous technical dictionaries
18 confirm that data," in quotations,
19 "including audio data, can be
20 represented in both analog," in 12:13:37
21 quotes, "or digital," in quotes,
22 "form. Digital data is," quotes,
23 "data represented in discreet
24 discontinuous form, as contrasted with
25 analog data represented in continuous 12:13:47

1 form," end quote.

2 Q Okay. And then paragraph -- in paragraph 63,
3 the second sentence, it says:

4 "In the generic sense, packets
5 refer to the manner in which data are 12:14:04
6 organized into discreet units for
7 transmission and switching through a
8 data network."

9 Do you see that?

10 A Yes. 12:14:12

11 Q So data packets are in digital form, correct?

12 A Data packets are, yes.

13 Q Can data packets be in analog form?

14 A Data can be in analog form, but it's not
15 transmitted using packets. 12:14:37

16 Q Right. So data packets are not in analog
17 form, correct?

18 A Correct.

19 Q Are there other discreet discontinuous forms
20 of data that are not data packets? 12:14:53

21 A Yes.

22 Q What are those forms of data?

23 A A digital audio stream that consists of bits,
24 those are not packets. It's continuous stream of
25 bits or a digital audio stream that we talked about 12:15:17

1 before that has been modulated through some
2 pre-agreed encoding scheme like pulse code
3 modulation. Though those are not -- those are
4 digital streams that are not packets.

5 Q In order to stream audio from the internet, 12:15:44
6 from an internet media source on a speaker, does
7 that streaming audio have to be in the form of
8 packets or can it be in a continuous form of data?

9 A If we're talking about the general purpose
10 internet, you know, it only supports packet 12:16:32
11 protocols. So it would have to be put in that form.

12 Q I'd like to introduce a new exhibit here. I
13 uploaded it and marked it as Exhibit 10.

14 (Exhibit 10 was marked for identification
15 electronically and is attached hereto.) 12:16:55
16 BY MR. PAK:

17 Q Let me know when you see that.

18 A I see it.

19 Q Do you recognize this document?

20 A Yes. It's the '206 patent. 12:17:06

21 Q I want to take a look at Column 4. It's on
22 PDF page 16 and line 36. It says:

23 "As used herein, unless
24 explicitly stated otherwise, an audio
25 source or audio sources are in digital 12:17:32

1 format and can be transported or
2 streamed over a data network."

3 Do you see that?

4 A I do.

5 Q The '206 patent discusses sending and 12:17:43
6 receiving audio in digital form, correct?

7 A Yes.

8 MR. KAPLAN: Object to form.

9 BY MR. PAK:

10 Q Is there anywhere in the '206 patent that 12:17:52
11 discusses sending and receiving audio data in the
12 form of -- let me -- let me rephrase that.

13 Is there anywhere in the '206 patent that
14 discusses sending and receiving audio in analog
15 form? 12:18:08

16 A That wasn't -- I'd have to go look at it
17 again. I don't remember every word of the patent.
18 The sections that I looked at for my opinion were --
19 you know, I just looked for those things. So I
20 would have to go look and make sure of the answer. 12:18:26

21 Q Sitting here today, you can't recall any
22 passages in the '206 patent that discusses sending
23 and receiving audio data in analog form, correct?

24 MR. KAPLAN: Object to form.

25 Mischaracterizes testimony. 12:18:43

1 THE WITNESS: Like I said, I don't want to
2 say I do or I don't because I don't -- I'd have to
3 go read it. It's possible.

4 For example, I know that at Sonos there are
5 Sonos audio products that have analog inputs on the 12:18:55
6 back. And so I just don't know if -- I just don't
7 know if there is a section in this patent since I
8 haven't looked for that specifically.

9 BY MR. PAK:

10 Q Would it help if we take a few minutes for 12:19:17
11 you to review the patent and see if you can find any
12 passages that discuss sending and receiving audio in
13 the form of analog data?

14 A Sure.

15 Q Okay. So how about we do that, take a few 12:19:29
16 minutes.

17 A Okay.

18 THE REPORTER: Do you want to go off the
19 record or not?

20 MR. KAPLAN: No. 12:19:46

21 THE WITNESS: By doing a quick search, I
22 could find -- I could keep looking -- Column 4, line
23 65:

24 "The device 112 is configured to
25 receive an analog audio source, e.g., 12:20:23

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1 for broadcasting."

2 The audio sources -- Column 5 -- I'm just
3 reading from line 65 onward. The last line there
4 says:

5 "The analog audio sources can be 12:20:45
6 converted to digital audio sources."

7 BY MR. PAK:

8 Q Right. And then the next sentence says:

9 "In accordance with the present
10 invention, the audio source may be 12:20:58
11 shared among the devices on network
12 108."

13 Do you see that?

14 A I do.

15 Q So let's go back to paragraph 4 -- column 4, 12:21:07
16 line 50. Could you please read that paragraph for
17 me.

18 A

19 "The network 108 may be a wired
20 network, a wireless network, or a 12:21:22
21 combination of both."

22 Q You can keep going.

23 A

24 "In one example, all devices,
25 including the zone players 102, 104, 12:21:32

1 and 106, are coupled to the network by
2 wireless means, based on an industry
3 standard such as IEEE 802.11.

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4 | "Another example --
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5	Q	You can stop there.	12:21:47
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6 As the patent describes, network 108 is
7 talking about an internet-based network that uses
8 industry standards such as the IEEE 802.11 standard,
9 correct?

10 MR. KAPLAN: Objection. Mischaracterizes the 12:22:04
11 document.

12 THE WITNESS: I don't -- I wouldn't call this
13 internet based. This just tells me how the
14 components are communicating, which is a wireless --
15 standard 802.11 wireless. 12:22:19

16 BY MR. PAK:

17 Q And the 802.11 standard requires data to be
18 transmitted or received in digital format, correct?

19	A	Correct.
----	---	----------

20	Q	And that data transmitted over 802.11	12:22:33
21		standard requires data to be transmitted and	
22		received in the form of data packets, correct?	

23	A	Correct.
----	---	----------

24	Referring back to your analog question, I'm	
25	just seeing more sections here. Column 6, line 3	12:22:59

1 and 10. Without reading them directly, it talks
2 about the ability to handle analog signals, whether
3 it's processing them from inputs and then converting
4 them to digital to share with other devices on a
5 network. And then line 9 on the same column: 12:23:21

6 "The audio amplifier is typically
7 an analog circuit, but powers the
8 provided analog audio signals to drive
9 one or more speakers."

10 Q So those sentences that you point out, you 12:23:43
11 know, on Column 6 of the patent talk about
12 processing analog signals, but when that signal is
13 actually sent or received over the network, it talks
14 about producing digital signals. So it's talking
15 about converting the analog signals to digital 12:23:56
16 signals to communicate over the network, correct?

17 A Yes.

18 MR. KAPLAN: Object to form.

19 THE WITNESS: Yes. I was just responding to
20 your question as to whether there is any mention of 12:24:06
21 analog in this. Clearly the patent talks about
22 products that could handle connections to analog
23 input signals.

24 BY MR. PAK:

25 Q Right. But does this patent talk about 12:24:17

1 sending analog data over the network, such as
2 network 108 described in the patent?

3 A I think it does indirectly. Because in line
4 50 that you read before, the network may be a wired
5 network. It doesn't say that that needs to be 12:24:47
6 digital. It could be analog.

7 Q Well, you know, let's go back to Column 4,
8 line 36. It says:

9 "As used herein, unless
10 explicitly stated otherwise, when an 12:25:03
11 audio source or audio sources are in
12 digital format, they can be
13 transported or streamed over a data
14 network."

15 Right? So in line -- line 50 when it says 12:25:14
16 "The network 108 may be a wired network or a
17 wireless network, or a combination of both," it's
18 talking about sending data in digital format, right?
19 Unless it's stated otherwise, you have to assume
20 that you're sending or receiving data in digital 12:25:30
21 format, correct?

22 MR. KAPLAN: Objection. Mischaracterizes the
23 document.

24 THE WITNESS: I don't know. It's hard --
25 it's like the paragraph here, maybe. I'm not 12:25:45

1 certain about that.

2 BY MR. PAK:

3 Q Sure. Let me ask you this way.

4 So in line 50 in Column 4, it says:

5 "The network 108 may be a wired 12:25:55
6 network or a wireless network or a
7 combination of both."

8 Right?

9 A Yes.

10 Q Does that sentence mention analog? 12:26:02

11 A No.

12 Q Okay. Let's take a look at paragraph 64 of
13 your declaration. So back to Exhibit 9. It's PDF
14 page -- PDF page 23.

15 And in the middle of that paragraph, it says: 12:26:43

16 "These networks allowed cellular
17 devices to send and receive data, as
18 Sonos requires, typically in the form
19 of voice calls."

20 Do you see that? 12:26:56

21 A Yes.

22 MR. KAPLAN: I'm sorry. Which paragraph
23 again?

24 MR. PAK: Paragraph 64.

25 MR. KAPLAN: Thank you. 12:27:08

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1 THE WITNESS: I see it.

2 BY MR. PAK:

3 Q Does the '206 patent discuss sending or
4 receiving audio data over a cellular or voice
5 network?

12:27:19

6 A Well, it discusses sending or receiving it
7 over wireless networks. So that would cover all
8 kinds of wireless networks in the broadest sense,
9 right? It doesn't exclude them.

10 Q Can you send data over a voice network to
11 render audio on a device?

12:27:41

12 A So because you don't have construction of
13 what a voice network is, claim construction around
14 voice network, I want to know what your definition
15 is of voice network so I can answer correctly.

12:28:14

16 Q Right. So earlier you said a voice network
17 would be -- like an example would be a telephony
18 network, like a public switch telephone network,
19 correct?

20 A Correct.

12:28:28

21 Q And you wouldn't send or receive audio data
22 over a public switch telephone network, would you?

23 A Why not? Voice is audio data basically,
24 right? So you kind of are doing that.

25 Q Can you have speakers connected to a public

12:28:44

1 switch telephone network and send audio data to
2 render that audio data on one of those speakers?

3 A Oh, yeah, absolutely. Speaker phones, right?

4 Q Do the patents disclose speaker phones?

5 A I was just giving you an example of what you 12:29:08
6 could connect. You can connect any kind of
7 transducer because what you're getting out is an
8 audio signal. So if you send it to a loudspeaker,
9 it will play, and the loudspeaker can be any kind of
10 form. 12:29:29

11 Q Does the '206 patent discuss sending or
12 receiving data over a public switch telephone
13 network?

14 A Well, as I say, it talks about sending and
15 receiving it over networks in general and it doesn't 12:29:42
16 exclude that, but it doesn't mention it specifically
17 either.

18 Q Is a speaker phone capable of processing and
19 rendering audio data?

20 A Yes. 12:30:03

21 Q Does the '206 patent discuss sending or
22 receiving audio data via RCA cables?

23 A The discussion we had before about connecting
24 analog sources, and I do know that some of the Sonos
25 speakers have that in the back, but that connection 12:30:30

1 would typically be an RCA cable. It might also be a
2 mini jack, a 1/8th inch jack or cable.

3 Q Okay. So let's look at the patent, Column 1,
4 line 40. Would you please read that first sentence
5 for me. 12:31:15

6 A

7 "Currently one of the systems
8 that can meet part of such demand is a
9 conventional multizone audio system
10 that usually includes a number of 12:31:21
11 audio players."

12 Q Keep going.

13 A

14 "Each of the audio players has
15 its own amplifiers and a set of 12:31:28
16 speakers and typically installed in
17 one place, e.g., the room. In order
18 to play an audio source at one
19 location, the audio source must be
20 provided locally or from a centralized 12:31:41
21 location."

22 Keep going?

23 Q No, that's okay.

24 Is there anything in this patent that
25 distinguishes those type of conventional multi-audio 12:32:07

1 systems to what is disclosed in the patent as the
2 invention?

3 MR. KAPLAN: Objection to form.

4 BY MR. PAK:

5 Q Let me put it this way. The next paragraph, 12:32:34
6 can you read the first sentence of that -- of line
7 56.

8 A

9 "In order to achieve playing
10 different audio sources in different 12:32:44
11 audio players, the traditional
12 multizone audio system is generally
13 either hard wired or controlled by a
14 preconfigured and preprogrammed
15 controller." 12:32:55

16 Q Right. So the patent talks about traditional
17 multizone audio systems being either hardwired or
18 controlled by a preconfigured or preprogrammed
19 controller, and it distinguishes those traditional
20 multizone audio systems from the -- from the system 12:33:13
21 disclosed in the '206 patent as the invention,
22 right?

23 MR. KAPLAN: Object to the form.

24 THE WITNESS: I mean, that's kind of the
25 purpose of writing the background. What you're 12:33:49

1 going to say after that is supposed to be better.

2 BY MR. PAK:

3 Q Right. So the disclosed system in the '206
4 patent that's described as the invention isn't
5 talking about these hardwired traditional multi-zone 12:34:07
6 audio systems, right?

7 MR. KAPLAN: Object to form.

8 THE WITNESS: Well, it doesn't completely go
9 away from it because it allows for a wired source,
10 an analog wired source to be connected to one of the 12:34:31
11 zone players and then be distributed. So it doesn't
12 completely remove them.

13 BY MR. PAK:

14 Q Does the patent discuss what the wired source
15 has to be, what form it has to be in? 12:34:49

16 MR. KAPLAN: Object to form.

17 THE WITNESS: It gives examples at the bottom
18 of Column 4, line 66, broadcasting, which is analog,
19 compact disk, which could be digital or analog,
20 depending on what connection you have. Yeah, those 12:35:20
21 are examples.

22 BY MR. PAK:

23 Q All right. So let's take a look at Column 5.
24 And I'm looking at line 33. It says:

25 "The wired interface 217 provides 12:35:39

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1 network interface functions by a wired
2 means, for example, an Ethernet
3 cable."

4 Do you see that?

5 A Yes. 12:35:46

6 Q So the patent discloses that the wired
7 network can be an Ethernet cable, right?

8 A That's a different network than the one that
9 connects -- this is not for connecting sources.

10 This is for connecting speakers together to -- could 12:36:07
11 be wired or wireless. The previous discussion was
12 about what kind of sources.

13 Q Right. So this is talking about the wired
14 interface of a zone player, correct?

15 MR. KAPLAN: Object to form. 12:36:36

16 THE WITNESS: Yes. This is talking about how
17 to connect multiple zone players, in this case,
18 speakers, whether they're wired or wireless. They
19 provide capability for both.

20 BY MR. PAK: 12:36:54

21 Q So let's talk about the zone player. So the
22 zone player has network interface -- so a zone
23 player has a network interface 202, which may
24 include one or both of the wireless interface 216
25 and a wired interface 217, right? 12:37:17

1 A Yes.

2 Q Okay. And specifically the wired interface
3 217 provides network interface function by wired
4 means, for example, an Ethernet cable, correct?

5 A Correct. And this is why I was talking about 12:37:39
6 the introduction before. It seems to contradict the
7 benefit because they say that the old systems were
8 all wired and so they're no good. But now they also
9 provide capability for wired. So it's just a
10 different type of wire, I suppose. 12:37:55

11 Q As you recall, did these traditional
12 multizone audio systems include speakers that were
13 connected via an Ethernet cable?

14 A No. That's what I'm saying. They were
15 connected by copper RCA cables or speaker cables 12:38:16
16 directly.

17 So this is a different kind of cable, but
18 still the possibility existed of speakers in
19 different zones or rooms that are connected by
20 wires. Just a different kind of wire. 12:38:31

21 Q What is the difference between an Ethernet
22 cable and a copper wire such as an RCA cable?

23 A I guess Ethernet cables are also made of
24 copper, but they have different kinds of endings and
25 they have multiple strands in them carrying data. 12:39:06

1 So I guess I would consider an Ethernet cable
2 capable of carrying digital packet data, whereas an
3 audio interconnect carries analog audio data.

4 Q So an RCA cable carries analog data, whereas
5 an Ethernet cable carries digital data packets, 12:39:38
6 correct?

7 A To be totally clear, analog cables -- sorry,
8 RCA cables can also carry digital data. Just not
9 packetized.

10 Q Okay, that makes sense. 12:39:54

11 I want to take a look at paragraph 66 of your
12 declaration.

13 A Yes.

14 Q Let me get to it real quick. The second
15 sentence of paragraph 66 says: 12:40:21

16 "There are many types of networks
17 that do not require a network device
18 to both send and receive data from
19 another device. For example, networks
20 may be configured in a ring such that 12:40:31
21 no device both sends and receives data
22 directly to and from another device."

23 Do you see that?

24 A Yes.

25 Q Okay. So let's take a look at Sonos's 12:40:43

1 proposed construction on page 21 of your
2 declaration. Could you please read Sonos's
3 construction for data network.

4 A

5 "A medium that interconnects the 12:41:00
6 devices enabling them to send data
7 packets to" --
8 I'll start over.

9 "A medium that interconnects
10 devices, enabling them to send digital 12:41:09
11 data packets to and receive digital
12 data packets from each other."

13 Q Does Sonos's proposed construction of data
14 network require sending and receiving data directly
15 to and from another device? 12:41:26

16 MR. KAPLAN: Object to form.

17 THE WITNESS: I guess I'm not sure what
18 "directly" means in this context. We're connecting
19 two devices.

20 BY MR. PAK: 12:41:45

21 Q So let me ask you this way. Does the word
22 "directly" appear in Sonos's proposed construction?

23 A It does not.

24 Q Okay. So Sonos's construction of data
25 network does not require sending and receiving data 12:41:56

1 directly to and from another device, correct?

2 MR. KAPLAN: Object to form.

3 THE WITNESS: I don't know how else to
4 interpret this. It says, "sending and receiving
5 from each other." So unless there is something in 12:42:10
6 between that is not disclosed, what else could it
7 be, right?

8 BY MR. PAK:

9 Q Right. So Sonos's construction of the data
10 network is broad enough to cover directly or 12:42:19
11 indirectly sending and receiving data, correct?

12 MR. KAPLAN: Object to form.

13 THE WITNESS: Right, that's true. But my
14 construction, though, was not really focused around
15 the directly part. It was that a data network, as 12:42:43
16 we've already discussed since this morning, doesn't
17 have to be digital packets.

18 BY MR. PAK:

19 Q Right. But let's look at paragraph 66 again.
20 And it says: 12:43:00

21 "For example, networks may be
22 configured in a ring such that no
23 device both sends and receives data
24 directly to and from another device."
25 Right? But Sonos's construction doesn't say 12:43:11

1 or doesn't require direct -- directly sending and
2 receiving data, right?

3 MR. KAPLAN: Object to form.

4 THE WITNESS: The intent of this sentence
5 that I wrote here was that "directly" is kind of a 12:43:38
6 substitution for each other. Because obviously in a
7 network, in a ring network, devices are sending data
8 and they're receiving data. But it's not a send and
9 receive between two devices. And that's what I
10 meant by "directly" here. I didn't imply there was 12:43:54
11 nothing in between.

12 BY MR. PAK:

13 Q So -- sorry.

14 A No, no.

15 Q So in that -- so if a network is configured 12:44:03
16 in a ring, you'd agree with me that a device can
17 both send and receive data to and from each other?

18 A No. Because to and from each other means you
19 have two devices and they're talking back and forth.
20 And in a ring network, one device will send to the 12:44:27
21 next. If it has the token, it will -- let's say
22 it's clockwise orientation and it will send to the
23 next one and receive from the one before it. So
24 it's sending and receiving two different devices,
25 not a two-way communication. 12:44:50

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1 Q What is a token ring network?

2 A It's a set of devices connected in a network
3 that is -- as I described, think of a circle with
4 multiple points in it. Each of those is a network
5 device. The protocol is such that to avoid what 12:45:12
6 network people call collisions, which is when a
7 bunch of data tries to arrive at the same time, to
8 avoid that they use traffic police kind of system
9 where you can't talk unless you've been told to talk
10 because you have the token. And so data goes around 12:45:36
11 in circles. It can be clockwise. It can be
12 counterclockwise. And sometimes it's a star
13 configuration where there's a -- literally a central
14 node and everybody communicates through, or
15 sometimes it's a controller. So it's a different 12:45:51
16 configuration for a network topology.

17 Q I'd like to introduce a new exhibit here. I
18 uploaded a new exhibit marked as Exhibit 11.

19 Do you see that?

20 A Yes. I'm waiting for it to open. I see it. 12:46:21

21 (Exhibit 11 was marked for identification
22 electronically and is attached hereto.)

23 BY MR. PAK:

24 Q Do you recognize this document?

25 A Yes. 12:46:33

1 Q This was attached as Appendix L to
2 Dr. Schmidt's declaration, and you reviewed this
3 document, right?

4 A I did, yes.

5 Q I want to take a look at the last page, PDF 12:46:42
6 page 6.

7 Do you see the token ring network
8 configuration at the bottom left?

9 A I see it.

10 Q So in this token ring network configuration, 12:46:56
11 can a given device send data to or receive data from
12 another device?

13 A Yes, but not from the same device in both
14 directions.

15 Q Okay. And in the last sentence below that 12:47:17
16 configuration, it says:

17 "Any PC can grab a passing token
18 and attach data and the address of
19 another PC to it, as each PC in turn
20 watches for tokens that are addressed 12:47:41
21 to it."

22 Right?

23 A Yes.

24 Q So you're saying in this configuration --
25 let's pick one example. There's five PCs, right? 12:48:10

1 A Yes.

2 Q Let's look at the top right PC. So this top
3 right PC can receive data from one of these PCs,
4 correct?

5 A Assuming that the token protocols were 12:48:32
6 followed, yes.

7 Q From what devices can this PC receive data
8 from?

9 A From whichever device decided to address the
10 token to that PC. 12:48:56

11 Q So it can be any one of the four other
12 devices on this token ring network, correct?

13 A It can, although you'll have to -- if it's
14 the one next to or below to the right, it would have
15 to wait a while until it gets there because it has 12:49:19
16 to go through all the other ones. But yes.

17 Q So can that PC on the top right transmit data
18 to any of the four other PCs in the token ring
19 network?

20 A Again, yes, if it decides it wants to 12:49:36
21 transmit to one of them and puts that information on
22 the token and addresses it to that PC, yes, it can
23 do that.

24 Q Okay. And I want to go back to your
25 declaration now, looking at paragraph 67. On page 12:49:53

1 24.

2 A Yes.

3 Q It says:

4 "Various publications also
5 confirm that unidirectional data 12:50:08
6 networks were well known in the art."

7 And you relied on U.S. patent

8 No. 6,081,907.

9 Do you see that?

10 A I do. 12:50:19

11 Q And you would have to go to the electronic
12 exhibit, because I want to look at PDF page 157.

13 A Okay. That was Exhibit 9?

14 Q Yes, correct.

15 MR. KAPLAN: Which PDF page? 12:50:51

16 MR. PAK: PDF page 157.

17 THE WITNESS: I'm looking for an easier way
18 besides scrolling.

19 MR. KAPLAN: I don't know that there is.

20 THE WITNESS: I'm almost there. Okay. 12:51:30

21 Wait. I'm sorry. Are we talking about the
22 monthly unique users graph?

23 BY MR. PAK:

24 Q No. Hold on one second. I'm putting it in
25 the chat right here. 12:51:56

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1 MR. KAPLAN: 157 for me is the '907 patent.

2 THE WITNESS: Oh, I had 57. Okay.

3 BY MR. PAK:

4 Q There's a little scroll controls you can --

5 A Yeah. 12:52:13

6 Q Yeah.

7 A Okay. I see it.

8 Q Okay. And this is a copy of the '907 patent
9 provided as an exhibit to your declaration, right?

10 A Yes. 12:52:36

11 Q Okay. And I want to go down to PDF page 165.

12 And I want to focus on the background section of the
13 '907 patent.

14 A Okay.

15 Q Okay. And the first paragraph of the 12:52:58
16 background section says:

17 "Conventional computer networks
18 are bidirectional, allowing data
19 communication in both directions
20 between servers and clients. 12:53:08

21 Transmitting data over these
22 bidirectional data networks has been a
23 mainstay of computer technology for
24 many years and the communication
25 protocols are well established." 12:53:20

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1 Do you see that?

2 A Yes.

3 Q All right. And the third paragraph in the
4 background section, could you actually read that
5 paragraph for me.

12:53:31

6 A

7 "Apart from the classic
8 bidirectional data networks, there is
9 an increasing interest in the use of
10 broadcast or multicast networks to 12:53:40
11 deliver computer data and other
12 content to clients. These types of
13 distribution networks are
14 unidirectional in that data flows from
15 the server to the clients, but no 12:53:50
16 return communication is possible over
17 the same communication path."
18 More?

19 Q That's okay.

20 So the '907 patent actually distinguishes the 12:54:03
21 classic bidirectional data network from a
22 unidirectional broadcast or multicast network,
23 correct?

24 A Yes.

25 MR. KAPLAN: Object to form. 12:54:17

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1 BY MR. PAK:

2 Q Okay. Let's take a look at Column 3, the
3 second paragraph. It says:

4 "The bidirectional data network
5 28 represents various types of 12:54:33
6 networks, including the internet, a
7 LAN, local area network, a WAN, wide
8 area network, and the like."
9 Do you see that?

10 A I do. 12:54:46

11 Q In the next paragraph it says:

12 "The broadcast center 26 receives
13 the data served from the content
14 servers 22(l) through 22(K) over the
15 network 28, and broadcasts the data 12:55:02
16 over a broadcast network 30 to the
17 clients 24(l) through 24(M)."
18 Do you see that?

19 A I do.

20 Q Now, if you look at Figure 1 of the '907 12:55:15
21 patent, and it's PDF page 158, you see there's a
22 separate bidirectional data network 28 and a
23 broadcast network 30, right?

24 A 28 and 30, yes, I see it.

25 Q So you'd agree with me that the bidirectional 12:55:45

1 data network 28 and broadcast network 30 in the '907
2 patent are different networks, right?

3 MR. KAPLAN: Object to form.

4 THE WITNESS: That's what is shown in this
5 diagram. They're showing an example that has both 12:56:11
6 in there.

7 BY MR. PAK:

8 Q As shown in Figure 1, you'd agree that data
9 network 28 is bidirectional, whereas the broadcast
10 network 30 is unidirectional, correct? 12:56:24

11 A Yes, that's what is being disclosed.

12 Q Is there anywhere in the '907 patent that
13 mentions that broadcast network 30 is a data
14 network?

15 MR. KAPLAN: Object to form. 12:56:43

16 BY MR. PAK:

17 Q And we can take a minute if you need a minute
18 to review the patent.

19 A Yeah, let me take a minute.

20 So Column 3, line -- the paragraph that 12:57:30
21 starts at line 33, it says:

22 "The broadcast network 30 can be
23 implemented in a variety of ways. For
24 instance, the broadcast network might
25 be implemented as a wireless network 12:57:55

1 configured for one-way transmission,
2 i.e., satellite, radio, microwave
3 et cetera. The broadcast network
4 might also be a network that supports
5 two-way communication, but is 12:58:08
6 predominantly used for unidirectional
7 multicasting from the broadcast center
8 26 to many clients simultaneously."

9 Q So in that sentence, does the patent use the
10 word "data network"? 12:58:29

11 A Well, as we've said before several times,
12 wireless networks that transmit data are data
13 networks. And so it doesn't say data network when
14 it talks about ATM or Ethernet or anything else.
15 These are all data networks. 12:58:54

16 Q Why does the patent use the term "data
17 network" when it describes data network 28, but
18 doesn't use the term "data network" when it talks
19 about broadcast network 30?

20 MR. KAPLAN: Object to form. 12:59:09

21 THE WITNESS: I don't know what they had in
22 mind in their language to write it that way, but --
23 I don't know. I can't answer why they said it that
24 way.

25 ////

1 BY MR. PAK:

2 Q Let's look at Column 4 of the '907 patent.

3 If you look at line 22 --

4 A Yes.

5 Q It says: 12:59:45

6 "The packet encoder 52

7 encapsulates packets of data with

8 appropriate headers for transmission

9 over the data network and broadcast

10 network." 12:59:57

11 Do you see that?

12 A Yes.

13 Q So this patent discloses that the

14 bidirectional data network 28 and the broadcast

15 network 30 both transmit data in the form of data 01:00:12

16 packets, right?

17 A I can indirectly assume that based on this

18 sentence.

19 Q Do you see any disclosure in the '907 patent

20 where data that is transmitted over the data network 01:00:33

21 or the broadcast network is not in the form of data

22 packets?

23 MR. KAPLAN: If you need to review the

24 patent, you can.

25 BY MR. PAK:

1 Q Sure. Take a minute if you need a minute to
2 review.

3 A I think it goes back to Column 3, the
4 paragraph that I was reading before, line 33 --
5 actually, line 36 where it gives examples. 01:00:59
6 Satellite, radio, and microwave. What we talked
7 about before, satellite may or may not be data. But
8 radio and microwave is -- may not be data packet,
9 but radio and microwave are most likely not packet
10 based. So it's certainly possible the way they 01:01:25
11 wrote it.

12 BY MR. PAK:

13 Q Let's take a look at the figures here. And I
14 want to take a look at Figure 4. Let me see if I
15 can find the description for it. 01:01:58

16 Actually, let's take a look at Column 5, line
17 35. The paragraph says:

18 "Figure 4 shows exemplary steps
19 in a method for serving data packets
20 over the unidirectional network." 01:02:21
21 Do you see that?

22 A Yes.

23 Q So Figure 4 is describing a method specific
24 to transmitting data packets over broadcast network
25 30, right? 01:02:35

1 MR. KAPLAN: Object to form.

2 THE WITNESS: It's describing a method, but
3 not all the methods, right? Because we talked about
4 other possibilities. In this paragraph it's a
5 method, yes. 01:02:47

6 BY MR. PAK:

7 Q And then Column 6, line 15, it says:

8 "Figure 5 shows the byte-wise
9 technique for generating a redundancy
10 packet from multiple data packets 01:03:25
11 within a redundancy group."

12 Do you see that?

13 A I'm sorry. I heard it, but I missed which
14 paragraph we're in.

15 Q Column 6, line 15. 01:03:37

16 A Yes, I see it.

17 Q So Column 5 again is describing a certain
18 technique for generating packets, right? Data
19 packets?

20 MR. KAPLAN: Object to form. 01:03:54

21 Do you mean Figure 5?

22 BY MR. PAK:

23 Q Yeah, I'm sorry. Let me rephrase.

24 Figure 5 is illustrating a specific technique
25 for generating data in the form of data packets, 01:04:09

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1 right?

2 A In this paragraph it's talking about a
3 specific aspect of it, aspect of the redundancy
4 formatter, I think is what they're talking about
5 here. 01:04:35

6 Q Right. But, generally speaking, Figure 5 is
7 talking about data packets, correct? It's talking
8 about data in the form of data packets.

9 MR. KAPLAN: Object to form.

10 THE WITNESS: It is. I'm just looking a 01:04:50
11 little further down where it says it's illustrative
12 for example purposes. "Other computations may be
13 used" -- this is line 30 of the same column.

14 So there are examples that involve packets, I
15 agree with that. But they're also saying there are 01:05:20
16 other ways.

17 BY MR. PAK:

18 Q Okay. And then Column 7, second paragraph,
19 it says:

20 "Figure 6 shows an exemplary data 01:05:31
21 structure 110 for data packet formed
22 by packet encoder 52 and redundancy
23 formatter 54."

24 Do you see that?

25 A I see it. 01:05:42

1 Q So we have Figure 4 is also talking about
2 data packets, right?

3 A Figure 6, you mean?

4 Q I'm sorry. So Figure 6 is also talking about
5 data packets, right? 01:06:02

6 A Yes, it is. It's showing the structure. If
7 you have data packets, this is what they should look
8 like.

9 Q And the top of column 8, it says:
10 "Figure 7 shows exemplary steps 01:06:12
11 in a method for receiving data packets
12 transmitted over a unidirectional
13 network."

14 Do you see that?

15 A Yes. 01:06:20

16 Q So Figure 7 is talking about data packets,
17 correct?

18 A Yes.

19 Q So are there any figures in the '907
20 patent -- in the '907 patent that doesn't talk about 01:06:32
21 data packets?

22 MR. KAPLAN: Object to form.

23 THE WITNESS: My reference to this patent was
24 not to address the data packet or not issue. It was
25 to address unidirectional and bidirectional and 01:06:55

1 possible coexistence.

2 So, no, I don't see any figure -- the figures
3 are focusing on byte patterns and headers and packet
4 related stuff. But, again, this was not my purpose
5 for quoting this patent. 01:07:24

6 MR. PAK: Okay. I want to transition away
7 from discussing data networks and talk about some of
8 the other terms in your declaration. Do you want to
9 take another break or just power through it?

10 Why don't we take a break and come back in 01:07:47
11 ten minutes. Is that okay?

12 THE VIDEOGRAPHER: Does anybody need more
13 time than that?

14 We can go off the record. We're off the
15 record at 1:07 p.m. 01:07:55

16 (Lunch recess.)

17 THE VIDEOGRAPHER: We are on the record at
18 1:43 p.m.

19 BY MR. PAK:

20 Q So far we talked about various examples of 01:43:32
21 data networks and local area networks. And I just
22 want to run by one more example with you to further
23 understand what local area network means to a person
24 of ordinary skill in the art.

25 So the question here is, if -- if someone 01:43:49

1 used two cups on a string to communicate with
2 another person, does that amount to communicating
3 over a local area network?

4 A I thought we covered this in the morning.

5 Q Yeah, we -- 01:44:01

6 A I think we talked about it --

7 Q Yeah, in the context of data network, but we
8 haven't talked about it in the context of a local
9 area network.

10 A I mean, honestly, don't take it personally. 01:44:10

11 It's a little bit of a silly example, over a string,
12 but I guess if we -- if we use the definition that a
13 person would use for networks, this is taking
14 acoustic data and converting it to mechanical form
15 and then -- to transmit, and then converting it back 01:44:40
16 to acoustical at the other end. So in that sense,
17 it is a data network.

18 The criteria I use for whether it's a local
19 area network is you have to have something to
20 compare it to. So stretching the string out to a 01:45:00
21 much larger area would produce a wider area string
22 network, and this would be a local area network. So
23 I think all those definitions are consistent.

24 Q So communicating using a string, two cups on
25 a string, would amount to a local area network in 01:45:28

1 your opinion?

2 MR. KAPLAN: Objection. Mischaracterizes
3 testimony. Asked and answered.

4 THE WITNESS: Local -- the word "local" only
5 makes sense if there's something else to compare it 01:45:43
6 to that is bigger or smaller.

7 And so, as I say, if there's a larger
8 distance with bigger string, that would be a wide
9 area network on a string and then this would be
10 called local if it was a smaller one. But by 01:45:58
11 itself, it's hard to say because you need a
12 comparison.

13 BY MR. PAK:

14 Q Right. So depending on the length of the
15 string that connects the two cups, right, someone 01:46:08
16 that uses two cups on a string to communicate with
17 another person, that would amount to communicating
18 over a local area network, correct?

19 MR. KAPLAN: Same objections.

20 THE WITNESS: Well, I guess same answer. It 01:46:24
21 depends. There's no -- there's no length of the
22 string that would be -- there's no size of the -- of
23 an actual LAN that we can say if you go past this,
24 you're no longer local area. It's -- as we saw,
25 LANs cover from a building to a hotel to a campus to 01:46:44

1 a wide area complex.

2 Same for this. It's a local area network
3 compared to something that is a longer distance, for
4 example, but I can't give you a number.

5 BY MR. PAK: 01:47:03

6 Q Sure. But if the string is -- so you're
7 saying that depending on the length of the string,
8 communicating using two cups attached to that string
9 can either be a local area network or a wide area
10 network then, correct? 01:47:18

11 A Yeah, sure.

12 Q Okay. So I want to go on to talk about the
13 media particular playback system term. And if you
14 take a look at paragraph 58 of your declaration. So
15 we're going back to Exhibit 9. 01:47:39

16 A Yes.

17 Q Would you please read paragraph 58 for the
18 record.

19 A Yes.

20 "I disagree with Dr. Schmidt that 01:47:51
21 a POSITA would understand the media
22 particular playback system of Claims
23 3, 15 or 26 to mean media playback
24 system. I have reviewed the
25 prosecution history, but find that it 01:48:04

1 does not resolve the debate relating
2 to the use of the term 'particular.'

3 Q Okay. So I want to take a look at the
4 prosecution history of the 615 patent. And just
5 give me a minute to introduce the exhibit. 01:48:18

6 Okay. So I've just uploaded here an exhibit
7 marked as Exhibit 12.

8 Do you see that?

9 A Yes.

10 (Exhibit 12 was marked for identification
11 electronically and is attached hereto.)

12 BY MR. PAK:

13 Q Do you recognize this document?

14 A Yes.

15 Q Okay. So this is Appendix N of Dr. Schmidt's 01:48:56
16 declaration, right?

17 A Yes.

18 Q You know, before we get into his response,
19 you know, just generally speaking, why do you think
20 an applicant would amend its claims during 01:49:14
21 prosecution?

22 MR. KAPLAN: Object to form.

23 THE WITNESS: This sounds like a legal
24 question to me.

25 I don't know. Because of an error, because 01:49:40

1 of additional facts, a response to the examiner.

2 Those are some reasons I can think of.

3 BY MR. PAK:

4 Q Can you think of any other reasons why an
5 applicant would amend its claims during prosecution? 01:49:57

6 MR. KAPLAN: Object to form.

7 THE WITNESS: No.

8 BY MR. PAK:

9 Q Well, look at this office action response.
10 Do you think the applicant here amended its 01:50:21
11 claims to overcome the cited references?

12 A It's hard for me to speak on behalf of the
13 applicant, the reasons that they had. I can only
14 speak as to, you know, what I see written here.

15 Is there a specific section you want me to 01:50:51
16 look at?

17 Q Yeah, so how about we take a look at the
18 remarks on PDF page 15.

19 A Okay.

20 Q All right. Again, the summary of the office 01:51:10
21 action, it says:

22 "In the non-final office action
23 mailed July 15, 2016, the examiner
24 rejected Claims 1, 6 through 10, 15
25 through 19, and 21 through 29 under 01:51:22

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1 pre-AIA 35 U.S.C. Section 1038, as
2 being allegedly unpatentable over
3 DaCosta in view of Dua."

4 Do you see that?

5 A I see it. 01:51:39

6 Q And there are some other, you know, 103
7 rejections with respect to Claims 3, 12 and 20,
8 correct?

9 A Yes.

10 Q Okay. And then looking at Section 3, the 01:51:46
11 response to the 103 rejections, the second sentence
12 says:

13 "For at least the reason that
14 cited references do not teach the
15 subject matter currently recited by 01:52:11
16 applicant's claims, the pending 103
17 rejections should be withdrawn."

18 Do you see that?

19 A I see it.

20 Q Okay. And let's take a look at Claim 1 on 01:52:21
21 PDF page -- PDF page 3.

22 Do you see that the applicant amended
23 Claim 1, right?

24 A Is this the paragraph numbered 2?

25 Q I'm taking -- I'm looking at the amendments 01:52:53

1 to the claims on PDF page 3.

2 A Oh, sorry, 3.

3 I see it, yes.

4 Q Do you think the applicant here amended

5 Claim 1 to overcome the cited references? 01:53:05

6 A So I probably looked through the cited
7 references, but I don't have them at the tip of my
8 tongue at the moment to be able to answer that
9 accurately.

10 Q Okay. Did you review any of the cited 01:53:26
11 references?

12 A I read through them. I wouldn't say that I
13 reviewed them in the same way that I reviewed the
14 patents.

15 Q Okay. So, again, I want to -- how about I 01:53:41
16 introduce one of the cited references and discuss
17 that. Just give me a minute.

18 I just uploaded an exhibit and marked it as
19 Exhibit 13.

20 Do you see that? 01:54:24

21 A Yes.

22 (Exhibit 13 was marked for identification
23 electronically and is attached hereto.)

24 BY MR. PAK:

25 Q Do you recognize this document? 01:54:35

1 A I do.

2 Q Okay. And this is one of the patent
3 publications that was cited in the non-final office
4 action mailed July 25th, 2016. Correct?

5 A Yes. 01:55:06

6 Q Okay. And you reviewed this reference,
7 right?

8 A As I said, I read through it but mostly
9 looked at the comments. So I didn't review it in
10 the same way that I would review an actual patent in 01:55:21
11 this case, but I -- I'm familiar with it.

12 Q Sure, that's fair.

13 I want to take a look at paragraph 57, so on
14 PDF page 24. Would you please read the second
15 sentence in paragraph 57. 01:55:47

16 A The second sentence?

17 Q Yes.

18 A Okay.

19 "The term 'media player'
20 generally refers to electronic devices 01:56:04
21 that are capable of processing media
22 such as audio, video, images,
23 presentations, animation, and internet
24 content, for example, cellular phones,
25 personal digital assistants (PDAs), 01:56:17

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1 music players, game players, video
2 players, cameras and the like."

3 Q Okay. And I want to skip to paragraph 142
4 now. It's on PDF page 32.

5 A Yes. 01:56:41

6 Q Would you please read that first sentence on
7 paragraph 142.

8 A Yes.

9 "Finally, the device's media
10 processing capabilities 461 are listed 01:56:47
11 in the RFID transmission data 450.

12 This is" --

13 Q Actually, please keep going. Read the second
14 sentence.

15 A 01:56:58

16 "This information indicates the
17 device's ability to process media
18 assets that are in specific formats."

19 Q Okay. And the patent further discusses some
20 example media formats, correct? 01:57:11

21 A Correct.

22 MR. KAPLAN: Object to form.

23 THE WITNESS: It does.

24 BY MR. PAK:

25 Q And looking at paragraph 143, could you 01:57:18

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1 please read the first sentence.

2 A

3 "This type of information allows
4 media player 100 to only transmit
5 media assets which are supported by 01:57:28
6 the target devices."

7 Q Would you please read the second sentence in
8 full.

9 A Oh, sure.

10 "This information also 01:57:38
11 allows either or both of the target
12 device and media player 100 to convert
13 media assets into supported formats
14 before transmission to the other when
15 required." 01:57:59

16 Q Okay. So based on, you know, these -- this
17 disclosure that we -- that I just had you read, do
18 you agree that Dua disclosed a media player that can
19 play particular media formats?

20 A Yes. 01:58:20

21 Q Do you agree that Dua disclosed a media
22 player that can play particular types of media?

23 A They disclosed a --

24 MR. KAPLAN: Object to form.

25 THE WITNESS: They disclosed a -- the ability 01:58:33

1 to play back multiple different types of media.

2 I think that's what you're asking, yes?

3 BY MR. PAK:

4 Q Right. So just to clarify, so does -- do you
5 agree Dua discloses a media player that can play 01:58:48
6 particular types of media?

7 MR. KAPLAN: Object to form.

8 THE WITNESS: I guess I'm trying to
9 understand how you're using the word "particular"
10 here. 01:59:13

11 It's -- they list a number of media by
12 example, but it's not clear to me that they're
13 excluding others. So I'm not sure how to answer
14 that.

15 BY MR. PAK: 01:59:27

16 Q Yeah, so let me reword this.

17 Does Dua disclose a media player that can
18 play audio?

19 A Yes.

20 Q Does Dua disclose a media player that can 01:59:39
21 play video?

22 A Yes.

23 Q So Dua discloses a media player that can play
24 any particular type of media, right?

25 MR. KAPLAN: Object to the form. 01:59:55

1 THE WITNESS: Well, under audio, they list
2 specific formats for that audio, but not all
3 possible. So I think "any" might be too broad
4 because they don't list -- it's hard to say.

5 BY MR. PAK: 02:00:11

6 Q All right. But Dua discloses a media player
7 that can play different types of multimedia, right?

8 A Right, different types of audio, different
9 types of video, and graphics.

10 Q Okay. So now let's go back to the office 02:00:32
11 action response, Exhibit 12.

12 And I want to take a look at Claim 3. And
13 it's on PDF page 4.

14 Do you see that?

15 A Yes. 02:00:59

16 Q What amendments did the applicant make to
17 Claim 3?

18 MR. KAPLAN: Object to form.

19 THE WITNESS: I'm sorry, Claim 3, PDF page 4
20 starts -- is a half paragraph. No, no, sorry. 02:01:15

21 BY MR. PAK:

22 Q Yeah, so Claim 3, you know, starts from PDF
23 page 4 and ends at PDF page 5, right?

24 A Yes.

25 Q Okay. So what -- so looking at the 02:01:33

1 amendments to Claim 3, could you please walk through
2 all the amendments the applicant made in this office
3 action response.

4 MR. KAPLAN: Objection. The document speaks
5 for itself. 02:01:50

6 THE WITNESS: I assume it's the underlined
7 words of the amendment.

8 BY MR. PAK:

9 Q Yeah. So, you know, I'm not trying to trick
10 you here. So the underlined -- the underlined words 02:01:59
11 represent words that were added.

12 A Okay.

13 Q And the strike -- and the strike through
14 represents terms, phrases that were deleted.

15 So I really just want, you know, to go over 02:02:14
16 all the amendments. You know, can you walk through
17 what amendments were made.

18 A Sure. So they added the word "particular" in
19 several places. "Particular playback device."
20 "Media particular playback system." 02:02:36

21 And then "wherein the first zone includes the
22 particular playback device."

23 So all the additions have to do with
24 "particular" except for the last one that they
25 added, "playing back multimedia content in 02:02:55

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1 synchrony."

2 And then they removed "initiating playback"
3 in two locations.

4 Q Okay. So looking at the amendments to
5 Claim 3, do you agree that the applicant added the 02:03:13
6 word "particular" in front of the word "playback"
7 throughout Claim 3?

8 A Yes, except for one location, second to the
9 last line.

10 MR. KAPLAN: Object to form. 02:03:34

11 THE WITNESS: Actually in a couple places.
12 It's not every "playback" that has "particular."
13 It's selective. The word "particular" was not added
14 in front of every time "playback" appears. Only
15 some. 02:03:53

16 BY MR. PAK:

17 Q Well, the word "particular" was -- all right,
18 I see.

19 So where it says "at least one additional
20 playback device," you're saying it doesn't say "at 02:04:02
21 least one additional particular playback device."
22 Is that right?

23 A Oh, that wasn't the only -- the second to
24 last line of the previous page, where it says
25 "control playback by the playback device," they did 02:04:22

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1 not add the word "particular" there.

2 Q Is "media playback system" a broader term
3 than "media particular playback system"?

4 A That's --

5 MR. KAPLAN: Object to form. 02:04:41

6 THE WITNESS: That's the part that was
7 difficult to ascertain. So that is one way to
8 interpret that, that it plays back only particular
9 media.

10 The other one is that there's all kinds of 02:04:56
11 playback systems, and I provided an example. It
12 plays -- records and plays back other kind of data
13 that is not media. And this would be particular to
14 media.

15 So it can be particular to all kinds of 02:05:08
16 media, particular to one media, or a typographical
17 error, as was indicated by Sonos. I couldn't tell
18 which of those three -- and there may be others.
19 And that was the reason for my opinion.

20 BY MR. PAK: 02:05:26

21 Q Sure. So before Claim 3 was amended in this
22 office action response, do you think Claim 3 was
23 indefinite?

24 So, you know, let me ask it this way. Do you
25 think Claim 3 was indefinite before the applicant 02:05:42

1 amended "media playback system" to "media particular
2 playback system"?

3 MR. KAPLAN: Object to form. Scope.

4 THE WITNESS: So are you asking if I had read
5 this without the word "particular" in the amendment, 02:06:05
6 would I still have the same opinion? Is that --

7 BY MR. PAK:

8 Q Yeah. So, you know, before this claim was
9 amended, right, you know, it used the term "media
10 playback system" instead of "media particular 02:06:19
11 playback system," right?

12 A Right.

13 Q So before Claim 3 was amended to use --
14 amended to use "media particular playback system,"
15 would a person of ordinary skill in the art 02:06:35
16 understand Claim 3? That's what I'm trying to ask.

17 A Right. Probably. Although I'm kind of
18 reforming an opinion by just quickly reading through
19 this paragraph, but I'm just reading it as if the
20 word "particular" isn't there, and it would just be 02:07:13
21 "media playback," right?

22 Q Right. So if you substituted the "particular
23 playback system" back to "media playback system," a
24 person of ordinary skill in the art would understand
25 Claim 3, correct? 02:07:29

1 A Well, but they didn't have "media playback
2 system" in Claim 3. It's not like they substituted.
3 They just added the word "particular" in front of
4 "playback," right?

5 Am I reading that correctly? 02:07:46

6 Q Yeah. Well, it says "a media particular
7 playback system," right, currently, as amended?

8 Do you see that?

9 How about you read the first four lines of
10 the claim before you get to the "wherein" clause. 02:08:21

11 A Wait, I'm sorry, am I looking at the same
12 paragraph?

13 Q Yes, it's --

14 A This is the bottom of page 3 in the document,
15 that paragraph, right? 02:08:35

16 Q Right. So let me read -- let me read Claim 3
17 as amended.

18 A Okay.

19 Q It says:

20 "The method of Claim 1 wherein 02:08:40

21 detecting the set of inputs to

22 transfer playback from the control

23 device to the particular playback

24 device comprises detecting a set of

25 inputs to transfer playback from the 02:08:52

1 control device to a particular zone
2 group of a media particular playback
3 system that includes a first zone and
4 a second zone."

5 Do you see that? 02:09:01

6 A Yes.

7 Q Okay. Before that -- before that claim
8 limitation was written, right, it said "a media
9 playback system," not "a media particular playback
10 system," correct? 02:09:18

11 A Correct.

12 Q So if we changed "a media particular playback
13 system" back to "a media playback system," would a
14 person of ordinary skill in the art understand what
15 Claim 3 means? 02:09:35

16 A The problem is I was assuming your question
17 meant to remove all "particulars." But you're
18 saying just to remove the one?

19 I think I can agree that "media playback" is
20 more general than "media particular." 02:10:30

21 Q Right. So you understand this claim -- you
22 understand Claim 3 if it didn't say "media
23 particular playback system" and instead it said
24 "media playback system," correct?

25 A I would understand it better, yes. 02:11:01

1 Q Do you think the applicant amended "media
2 playback system" to "media particular playback
3 system" to overcome the cited references?

4 A I don't know how to answer that. You'd have
5 to ask the applicant. 02:11:25

6 Q Well, we talked about the Dua reference,
7 right?

8 A Yes.

9 Q And the Dua reference disclosed a media
10 player that can play particular media formats, 02:11:33
11 right?

12 A Right.

13 Q And we talked --

14 A But there are many ways to respond to it. So
15 I don't know if that was the only reason, is what 02:11:51
16 I'm trying to say. I can't put myself in their
17 shoes.

18 Q Right. But you understand that Dua discloses
19 a media player that can play different kinds of
20 media formats and different types of media, right? 02:12:08

21 A Yes.

22 Q So why do you think the applicant amended
23 "media playback system" to be a particular system --
24 "a media particular playback system" if Dua already
25 teaches a media player that can play different kinds 02:12:28

1 of media formats and different types of media?

2 MR. KAPLAN: Objection. Asked and answered.

3 THE WITNESS: Yeah, I don't know the strategy
4 they had in amending the claim.

5 BY MR. PAK: 02:12:48

6 Q But do you agree with me that amending "media
7 playback system" to "media particular playback
8 system" would not overcome the teachings of Dua?

9 MR. KAPLAN: Object to form.

10 THE WITNESS: It depends how they conceive -- 02:13:07
11 or perceive the word "particular". If they were
12 trying to make this broader than the formats that
13 Dua was listing, then maybe that was their strategy.
14 So in their mind, they're trying to say it's
15 broader. 02:13:26

16 But, again, I don't -- I don't know why they
17 used the word "particular".

18 BY MR. PAK:

19 Q What does it mean to play a particular media
20 format? 02:13:43

21 A To play a particular media format? It means
22 the system is instructed to start playing that
23 format, that content in that format.

24 Q So does Dua disclose a system that's
25 instructed to start playing a particular media 02:14:17

1 format?

2 A He does. And he lists examples of those
3 formats.

4 Q What does it mean to play a particular type
5 of media? 02:14:35

6 A Isn't that the same answer -- or the same
7 question? I'm not sure -- as opposed to the format
8 you mean?

9 Q Yeah. So, you know, there's -- you can play
10 a particular type of media format, right, and that 02:14:55
11 would be like an MP3 or 4 and the like, correct?
12 But you can also play a particular type of media,
13 which could be video or audio, text and the like,
14 correct? Do you follow?

15 A Yes. 02:15:13

16 MR. KAPLAN: Object to form.

17 BY MR. PAK:

18 Q Okay. So in that context, does Dua disclose
19 a system that can play a particular type of media?

20 A He discloses several types of media, 02:15:40
21 pictures, images, PowerPoint presentations, audio,
22 video. Yes.

23 Q So when the applicant amended "media playback
24 system" to "media particular playback system," would
25 you agree with me that amending "media playback 02:16:11

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1 system" to "media particular playback system" would
2 not overcome the teachings of Dua?

3 MR. KAPLAN: Objection. Asked and answered.

4 THE WITNESS: I mean, that's a tough call.

5 That's why we have examiners, right? I don't know 02:16:31
6 if I can make that call.

7 BY MR. PAK:

8 Q Well, are there any other reasons why the
9 applicant would amend "media playback system" to
10 "media particular playback system"? 02:16:53

11 A Other than trying to respond to the examiner
12 or -- as I said, you know, that would be one reason.
13 Or they thought they had made an error and they're
14 trying to correct it. Those are the two main
15 reasons in my head. 02:17:10

16 Q Okay. So take a look at PDF page 15 again,
17 "Summary of the Office Action".

18 A Yes.

19 Q In the "Summary of the Office Action," it
20 talks about 103 rejections, correct? 02:17:34

21 A Yes.

22 Q Do you see any other rejections?

23 A I'm sorry, can you remind me what the 103
24 rejection is?

25 Q Yeah. So 103 rejection is an obviousness 02:17:48

1 type rejection.

2 There's also 102 type rejections, which could
3 be anticipation -- anticipatory type rejections,
4 right?

5 And then you also have 112 rejections, which 02:18:02
6 might have to do with, you know, formality of the
7 claims or, you know, maybe the patent lacks written
8 description of enablement and the like. Or it might
9 be indefinite, right?

10 A Right. Okay. 02:18:18

11 Q All right. So with that understanding here,
12 do you see in the Summary of the Office Action there
13 are only 103 rejections, right?

14 A Right.

15 Q And you don't see any 112 rejections, 02:18:28
16 correct?

17 A Correct.

18 Q So the -- so the applicant here was
19 responding to the examiner's 103 rejections in the
20 non-final office action of July 25, 2016, correct? 02:18:44

21 MR. KAPLAN: Object to form.

22 THE WITNESS: Yes. I presume that's what --
23 the response that was written by the applicant,
24 right?

25 BY MR. PAK: 02:18:56

1 Q Right.

2 A Paragraph 3?

3 Q Yeah. And looking at Claim 3, you're not
4 entirely sure why the applicant amended "media
5 playback system" to "media particular playback 02:19:12
6 system," correct?

7 A I'm not sure, no.

8 Q But you do understand that Dua discloses a
9 media particular playback system, correct?

10 A Correct. But I guess the question is, is 02:19:29
11 that the only way to respond to that rejection?
12 Without being the applicant and knowing more, I
13 couldn't answer that.

14 But it was a response presumably to address
15 the concern. That doesn't make it the correct 02:19:42
16 response. It's a response.

17 Q Right. And the only other reason why an
18 applicant would amend its claims, other than
19 responding to an examiner, would be to correct an
20 informality, such as a typographical error, correct? 02:19:59

21 MR. KAPLAN: Object to form.
22 Mischaracterizes. Leading.

23 Go ahead.

24 THE WITNESS: Those are two reasons I have
25 off the top of my head. I mean, there could be 02:20:12

1 other reasons that I'm not -- I don't think those
2 are the only two reasons to list.

3 BY MR. PAK:

4 Q Sitting here today, can you think of any
5 other reasons why an applicant would amend its 02:20:24
6 claims other than those two reasons?

7 A I don't know. The marketing department
8 decided that it would be important to have certain
9 words in the patent?

10 I'm thinking -- I'm trying to think of other 02:20:41
11 reasons. There could be a lot of other reasons. It
12 depends. They become a public record, obviously, so
13 that could be another reason.

14 Q Why do you think the applicant would amend
15 "media playback system" to "media particular 02:20:59
16 playback system" if amending "media playback system"
17 to "media particular playback system" would render
18 the claim indefinite, in your opinion?

19 A Well, I don't think they asked me my opinion,
20 so how would they know that this would become an 02:21:22
21 issue?

22 At the time, I'm sure it made sense to them
23 for some reason that we don't know, that I don't
24 know.

25 Q That's fair. 02:21:31

1 Now, I want to go back to the '206 patent
2 now. It's Exhibit 10. And I want to take a look at
3 column 8.

4 A Okay.

5 Q Okay. And you don't have to read this out 02:22:11
6 loud, but could you please review lines 7
7 through 36.

8 A 7 through 36?

9 Q Yeah. And then we can discuss.

10 And just let us know when you're finished. 02:22:35

11 A Okay.

12 Q Okay. Does the '206 patent disclose two
13 mechanisms for grouping zone players?

14 MR. KAPLAN: Object to the form.

15 THE WITNESS: I'm trying to see where it 02:23:34
16 says another mechanism. I see what it says, but it
17 starts -- the line starts with "One mechanism for
18 joining zone players."

19 BY MR. PAK:

20 Q Sure. And what is that one mechanism? 02:23:46

21 A It says:

22 "To link a number of zone players
23 together to form a group."

24 Q And what does the '206 patent say that one
25 mechanism entails to link a number of zone players 02:24:07

1 together to form a group?

2 A So they -- one second.

3 "The user may manually link each

4 zone player or room one after the

5 other," sequentially presumably. 02:24:24

6 Q So that's the -- that's the one mechanism
7 disclosed in the '206 patent, right?

8 A Yeah.

9 MR. KAPLAN: Object to form.

10 BY MR. PAK: 02:24:37

11 Q Is there another mechanism for linking a
12 number of zone players together to form a group?

13 A I guess you must be referring to line 23
14 perhaps:

15 "According to one embodiment, a 02:24:57

16 set of zones can be dynamically linked

17 together using one command."

18 Is that the other mechanism that you're
19 referring to?

20 Q Yes. 02:25:16

21 A Okay.

22 Q So the '206 patent discloses example zones,
23 correct?

24 A Right. They have a list of what they call
25 zones and then some names, yeah. 02:25:30

1 Q What are the example zones disclosed in
2 column 8?

3 A Bathroom, bedroom, den, dining room, family
4 room and foyer.

5 Q Okay. And looking at column 8, line 29, 02:25:45
6 could you please read that -- read the first three
7 sentences.

8 A Okay.

9 "For instance, a Morning zone
10 scene/configuration command would link 02:26:09
11 the bedroom, den and dining room
12 together in one action. Without this
13 single command, the user would need to
14 manually and individually link each
15 zone. Figure 3A provides an 02:26:21
16 illustration of one zone scene where
17 the left column shows the starting
18 zone grouping. All zones are
19 separate. The column on the right
20 shows the effects of grouping the 02:26:35
21 zones to make a group of three zones
22 named after Morning."

23 Q Okay. So I want to take a look at Figure 3A
24 now. It's on PDF page 8.

25 A Yes. 02:27:06

1 Q So on the left side of the arrow, you know, I
2 see bathroom, bedroom, den, dining room, family room
3 and foyer, right?

4 A Yes.

5 Q What do -- what does the left side of the 02:27:17
6 arrow represent, or those rooms represent?

7 A Based on what we just read, they call them
8 zones.

9 Q And the right side of the arrow -- well, what
10 does -- what does the right side of the arrow 02:27:42
11 indicate in Figure 3A?

12 MR. KAPLAN: Object to form.

13 THE WITNESS: It's the same -- the same
14 zones, but the -- but three of them have been put in
15 a -- some kind of group. And that group is -- has 02:27:54
16 the bracket that indicates that it's called Zone
17 Configuration/Scene.

18 BY MR. PAK:

19 Q What are -- what are the three zones that are
20 put into some kind of group? 02:28:22

21 A Bedroom, den and dining room.

22 Q Do you know what the name of that -- what the
23 patent describes as -- let me start over.

24 What does the patent call this group that
25 includes the three zones, bedroom, den and dining 02:28:49

1 room?

2 A Sorry, what was that column? Was it
3 column 8?

4 Q Yes, column 8.

5 A And it says "to make a group of three zones 02:29:03
6 named after Morning." A little odd that the word
7 "after" is there, but okay.

8 Q Yeah, go -- look at the sentence before. You
9 know, it says:

10 "Figure 3A provides an 02:29:32
11 illustration of one zone scene where
12 the left column shows the starting
13 zone grouping. All zones are
14 separate. The column to the right
15 shows the effect of grouping the zones 02:29:45
16 to make a group of three zones named
17 after Morning."
18 Right?

19 A Right.

20 Q So looking at Figure 3A, the group of zones, 02:29:52
21 bedroom, den and dining room, that's an illustration
22 of a zone scene, correct?

23 MR. KAPLAN: Object to form.

24 THE WITNESS: So I didn't provide an opinion
25 on what a zone scene is. To define that here kind 02:30:26

1 of on the fly would be a little premature, or I'd
2 have to look at it more.

3 You know, reading through for the -- for the
4 other opinions that I formed, I found that zone
5 scene represents some kind of grouping, but it has 02:30:43
6 something additional, some kind of theme or
7 attributes that go beyond a simple grouping.

8 But, again, that's not a -- that's not an
9 official opinion yet.

10 BY MR. PAK: 02:30:59

11 Q Okay. So, you know, looking at column 8, you
12 know, where we were before, and it says:

13 "For instance, a Morning zone
14 scene/configuration command would link
15 the bedroom, den and dining room 02:31:14
16 together in one action."

17 Do you see that?

18 A Yes.

19 Q And then, you know, as we discussed, it says:

20 "The column to the right shows 02:31:24
21 the effects of grouping the zones to
22 make a group of three zones named
23 after Morning."

24 Do you see that?

25 A I see. 02:31:32

1 Q So with respect to Figure 3A, you know, the
2 group of three zones named after Morning, that's
3 referring to the Morning zone scene, correct?

4 MR. KAPLAN: Object to form. Asked and
5 answered. 02:31:52

6 THE WITNESS: Well, but it has -- in line 29
7 it says "Morning zone scene/configuration," and then
8 in Figure 3A it says "zone configuration/scene," the
9 other way around.

10 So I couldn't tell from this for sure without 02:32:13
11 looking further if that is the definition of zone
12 scene or not. It has additional stuff.

13 BY MR. PAK:

14 Q Right. But your understanding of a zone
15 scene is that it's some kind of representation of a 02:32:28
16 grouping that has some additional attributes, right?

17 A Yes, that's my best understanding. The
18 attributes having to do with what throughout the
19 specification is called some kind of themes.

20 Q Why don't we take a look at column 10 of the 02:32:49
21 patent.

22 A Okay.

23 Q And I want to look at line 21 here. It says:

24 "Given a saved scene, a user may
25 activate the scene at any time or set 02:33:21

1 up a timer to activate the scene at
2 610."

3 Do you see that?

4 A I see it.

5 Q After the user activates the scene, what does 02:33:29
6 the '206 patent say happens next?

7 A So they say "scene" here, which is not clear
8 if they mean zone scene in their own language.
9 That's my first thought.

10 But what -- you're saying what do they say 02:33:59
11 in this sentence?

12 Q Yeah, so let's back up here.

13 And, you know, this is talking about with
14 respect to Figure 6, but at the -- you know, the
15 first paragraph of column 10, says: 02:34:14

16 "The process 600 is initiated
17 only when a user decides to proceed
18 with a zone scene at 602."

19 Do you see that?

20 A Yes. 02:34:26

21 Q So when it talks about a scene at step 610,
22 it's talking about a zone scene, correct?

23 MR. KAPLAN: Object to form.

24 THE WITNESS: Probably, but why don't they
25 just write it to make it clear? It's not -- most 02:34:50

1 likely is my answer.

2 BY MR. PAK:

3 Q Okay. So at 610, you know, I read this
4 before. It says:

5 "Given a saved scene, a user may 02:35:11
6 activate the scene at any time or set
7 up a timer to activate the scene at
8 610."

9 So what does the '206 patent say happens
10 next? 02:35:25

11 A After this action has happened?

12 Q Yes.

13 A It's the next couple of sentences, right?

14 Q So what does that say?

15 A So line 24: 02:35:44

16 "At 612, upon the activation of a
17 saved scene, the process 600 checks
18 the status of the players associated
19 with the scene."

20 Q Okay. So what does -- what does the patent 02:35:56
21 say happens at step 614?

22 A

23 "At 614, commands are executed
24 with the parameters, e.g., pertaining
25 to a playlist and volumes." 02:36:11

1 Q And what is the next --

2 A Yeah, go ahead?

3 Q Can you keep reading the next two sentences.

4 A Yes.

5 "In one embodiment, data, 02:36:23

6 including the parameters, is

7 transported from a member, e.g., a

8 controller, to other members in the

9 scene so that the players are caused

10 to synchronize an operation configured 02:36:34

11 in the scene. The operation may cause

12 all players to play back a song in

13 identical or different volumes or to

14 play back a pre-stored file."

15 Q So after a user activates a zone scene, data 02:36:51

16 is transported from a member to another member in

17 the zone scene, right?

18 MR. KAPLAN: Object to form.

19 THE WITNESS: So what is a member here?

20 BY MR. PAK:

21 Q So a member here -- you know, you just read

22 it here. It says "transferred from a member, for

23 example, a controller."

24 A member can also be a player, right?

25 A Okay. 02:37:24

1 Q I think -- I think member -- so member here
2 is referring to devices or nodes on the network,
3 right?

4 A Okay.

5 Q So you agree with me that after a user 02:37:36
6 activates a zone scene, data is transported from a
7 member, for example, a controller or a player, to
8 other members in the zone scene, right?

9 A Yes.

10 Q And what does that data that is transported 02:37:57
11 from a member to another member pertain to?

12 A Well, in the example they provide, it says it
13 pertains to a playlist and volumes. So we have to
14 read it the way they say it, right?

15 Q Yeah. So let's take a look at column 10, 02:38:23
16 lines 12 through 20. It starts with "In the example
17 of Figure 1."

18 Do you see that?

19 A Yes.

20 Q Could you please read the first two 02:38:35
21 sentences.

22 A

23 "In the example of Figure 1, the
24 scene is saved in one of the zone
25 players and displayed on controller

02:38:43

1 142. In operation, a set of data
2 pertaining to the scene includes a
3 plurality of parameters. In one
4 embodiment, the parameters include,
5 but may not be limited to, 02:38:56
6 identifiers, e.g., IP address, of the
7 associated players and a playlist.
8 The parameter may also include
9 volume/tone settings for the
10 associated players in the scene." 02:39:08

11 Q Okay. So returning to my question, after a
12 user activated a zone scene, there is some data that
13 is transported from a member to another member in
14 the scene, right?

15 MR. KAPLAN: Object to form. 02:39:27

16 THE WITNESS: That's what this paragraph
17 seems to describe, yes.

18 BY MR. PAK:

19 Q Right. And that data that's transported from
20 a member to another member is data pertaining to a 02:39:36
21 zone scene, correct?

22 MR. KAPLAN: Object to form.

23 THE WITNESS: Well, it's data -- it's a set
24 of parameters that they want to apply to that zone
25 scene they're sending. 02:39:58

1 BY MR. PAK:

2 Q Right. So let me ask you this way.

3 So when a scene is saved in one of the zone
4 players and displayed on a controller, right, there
5 is some form of data pertaining to that zone scene 02:40:12
6 that gets saved in the zone player, right?

7 MR. KAPLAN: Object to form.

8 THE WITNESS: This is not the data that we're
9 talking about here that's being sent to it. I'm not
10 sure I understand. 02:40:37

11 There's a scene that's been created. And
12 this to me says that from -- the user can decide
13 from the controller to select that scene -- and I'm
14 paraphrasing -- and send these parameters that we
15 talked about to the zone players in that scene. 02:40:53

16 BY MR. PAK:

17 Q Okay. So let's look -- let's relook at
18 column 10, lines 12 to 15. It says:

19 "In the example of Figure 1, the
20 scene is saved in one of the zone 02:41:08
21 players and displayed on controller
22 142. In operation, a set of data
23 pertaining to the scene includes a
24 plurality of parameters."

25 Do you see that? 02:41:18

1 A Yes.

2 Q Now, when you save a zone scene in one of the
3 zone players, you're really saving data pertaining
4 to the zone scene in one of the zone players,
5 correct? 02:41:29

6 MR. KAPLAN: Object to form.

7 THE WITNESS: I don't know. I don't know
8 what they're saving.

9 BY MR. PAK:

10 Q Well, the zone player has to save some form 02:41:44
11 of data that represents the zone scene, right, if
12 it's going to save a zone scene?

13 MR. KAPLAN: Object to form.

14 THE WITNESS: I guess what I'm trying to
15 figure out there is, isn't the zone scene the data 02:42:07
16 itself?

17 BY MR. PAK:

18 Q Well, let me ask -- let me ask you this way.

19 When you want to save a song on your
20 computer, some form of data is saved on that 02:42:27
21 computer, right, that represents the song?

22 A Well, it's the audio file that is the song.

23 Q Right. So when you -- when you save a song
24 on a computer, you're saving a -- you're saving a
25 file that represents a song and -- let me just 02:42:49

1 repeat that.

2 So when you save a song on a computing
3 device, you're saving a file that represents a song
4 in the computing device, correct?

5 A No, I don't agree with that. 02:43:17

6 What is a song? That's an abstract -- the
7 song is the file. So it's not a representation.
8 It's the song. That is the file that you're saving.

9 Q So when someone says -- so when a user
10 decides to save a song, what happens under the hood, 02:43:40
11 like, how does the computing device save a song?

12 A The song --

13 MR. KAPLAN: Object to the form.

14 THE WITNESS: Assuming the song is in digital
15 form, the computing device saves the song file which 02:44:02
16 contains a sequence of bits that, when played back,
17 are the song.

18 BY MR. PAK:

19 Q Yeah, so let me ask you it this way then.

20 When a user tries to save a song from a 02:44:27
21 computer from an Ethernet interface, right, if --
22 the user inputs a command to save the song, right?

23 A Yes.

24 Q And the computing device receives that
25 command to save a song, correct? 02:44:57

1 A Yes.

2 Q How does the computing device or, you know --
3 starting over here.

4 What action does the computing device do to
5 actually save a song in the computing device? 02:45:14

6 MR. KAPLAN: Object to form.

7 THE WITNESS: Assuming the saving location
8 has -- the saving location has been determined,
9 which is the intermediate step, the computing device
10 will start at the first bit and start writing it to 02:45:31
11 that location until it's finished. In memory or on
12 the hard drive somewhere.

13 BY MR. PAK:

14 Q So the computing device saves a song in the
15 hard drive or memory, you know, in the form of a 02:45:57
16 file, right?

17 A I don't know -- the song is a file. It
18 sounds like you're saying the song is something else
19 and then it gets converted to a file, and that's
20 just not the case. 02:46:17

21 The song is the file. Without that, there's
22 no song.

23 Q Well, let me ask you this way.

24 From a user perspective, right, a user would
25 say that he or she plays a song, right? He or she 02:46:59

1 wouldn't say that he or she plays a file, right, or
2 plays data?

3 A Well, that's the vernacular as opposed to the
4 actual technical. I could point you to a number of
5 users in my department that would say they're 02:47:27
6 playing a data file.

7 So, I mean, I don't think that's -- I mean,
8 maybe a user would say that, but it doesn't make it
9 technically correct.

10 Q All right. Let's talk about this in the 02:47:49
11 context of Microsoft Word then.

12 When you save a Microsoft Word document,
13 right, what format does your computing device save a
14 Microsoft Word document?

15 A It is again a sequence of bits that -- the 02:48:13
16 format is not open to us. It's a Microsoft internal
17 format. So I couldn't tell you what the file looks
18 like. You can only reopen it by using their user
19 interface.

20 Q When you save a Microsoft Word document, 02:48:39
21 you're saving some form of data, right?

22 A I mean, that's -- everything on your computer
23 is data, so yes.

24 Q And that data that is saved represents the
25 Microsoft Word document, right? 02:49:12

1 A I think it's the same thing. As I said
2 before, it doesn't represent it, it is the Microsoft
3 Word document. It's not like you have another
4 representation. It's the -- it's the only one, and
5 it is the document. 02:49:30

6 MR. PAK: Why don't we take a break now. I
7 think we've been going on for a while. I don't have
8 a whole lot left here. I know it's Friday. I don't
9 want to keep you here too long.

10 THE VIDEOGRAPHER: Off the record at 02:50:06
11 2:50 p.m.

12 (Recess.)

13 THE VIDEOGRAPHER: We are on record at
14 3:02 p.m.

15 BY MR. PAK: 03:02:27

16 Q I want to take a look at paragraph 74 of your
17 declaration.

18 A Yes.

19 Q Would you please read the first sentence.

20 A 03:02:48

21 "Claims 1 and 12 of the '033
22 patent recite transmitting an
23 instruction, and Claims 2 and 3 recite
24 wherein the instruction comprises an
25 instruction." 03:02:56

1 Q Okay. And during the break I uploaded the
2 '033 patent and marked it as Exhibit 14.

3 (Exhibit 14 was marked for identification
4 electronically and is attached hereto.)

5 BY MR. PAK: 03:03:09

6 Q Do you see that?

7 A Just checking here.

8 Yes.

9 Q And you looked at the '033 patent, correct?

10 A Yes, I did. 03:03:26

11 Q I want to take a look at Claim 1 on PDF
12 page 28.

13 Could you please read the transmitting an
14 instruction limitation that you mentioned in
15 paragraph 74 of your declaration. 03:03:50

16 A I'm still scrolling.

17 Q It's the second to the last page.

18 A Yes. You want me to read the part that has
19 the transmitting the instruction?

20 Q Yeah. How about -- how about you read the 03:04:13
21 transmitting an instruction limitation, you know,
22 all the way -- all the way before the "wherein"
23 clause.

24 A Okay. So line 53?

25 Q Yeah, correct.

1 A

2 "Based on receiving the user
3 input, transmitting an instruction for
4 at least one given playback device to
5 take over responsibility for playback
6 of the remote playback queue from the
7 computing device."

03:04:35

8 Q Okay. Let's take a look at Claim 2,
9 column 18. Could you please read Claim 2.

10 A

03:04:47

11 "The computing device of Claim 1
12 wherein the instruction comprises an
13 instruction for the cloud-based
14 computing system associated with the
15 media" --

03:04:58

16 Sorry. Let me start over.

17 "The computing device of Claim 1,
18 wherein the instruction comprises an
19 instruction for the cloud-based
20 computing system associated with the
21 media service to provide the data
22 identifying the next one or more" --
23 "the next one or more media items to
24 the given playback device for use in
25 retrieving at least one media item

03:05:10

03:05:22

1 from the cloud-based computing system
2 associated with the cloud-based media
3 service."

4 Q That's a pretty long claim, right?

5 So the instruction recited in Claim 2 is 03:05:38
6 referring to the instruction for at least one given
7 playback device to take over responsibility for
8 playback of the remote playback queue from the
9 computing device recited in Claim 1, correct?

10 A Yes. 03:06:14

11 Q In other words, the instruction recited in
12 Claim 2 is not referring to the program instructions
13 stored on the non-transitory computer readable media
14 as recited in Claim 1, correct?

15 MR. KAPLAN: Object to form. 03:06:43

16 THE WITNESS: I guess it's not clear what is
17 the difference between the program instructions.
18 Aren't they all instructions? I'm trying to
19 understand the reference here.

20 BY MR. PAK: 03:07:12

21 Q Does the instruction recited in Claim 2 refer
22 to an instruction for the at least one given
23 playback device to take responsibility for playback
24 on the remote playback queue from the computing
25 device in Claim 1, or does it refer to the program 03:07:35

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1 instructions recited in Claim 1?

2 A Well, that's the thing. They're all program
3 instructions, right? So this instruction,
4 whichever -- whatever it's referring to, is a
5 program instruction, right? So I don't see the 03:07:56
6 difference necessarily.

7 Q Well, Claim 1 recites an instruction for
8 the at least one given playback device to take over
9 responsibility for playback of the remote playback
10 queue from the computing device, right? 03:08:16

11 A Right. But at the beginning of Claim 2 is
12 program instructions, when executed by at least one
13 processor, cause the computing device to perform
14 functions comprising -- and then a whole bunch of
15 functions -- and then this instruction clause. So 03:08:35
16 it's --

17 Q Well, let's look at paragraph 74 again in
18 your declaration.

19 A Yes.

20 Q And you say that "Claim 1" -- I'm sorry: 03:08:49

21 "Claims 1 and 12 of the '033
22 patent recite transmitting an
23 instruction, and Claims 2 and 13
24 recite wherein the instruction
25 comprises an instruction." 03:09:04

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1 So in that sentence, you understand that
2 wherein -- the term "wherein the instruction"
3 recited in Claim 2 refers to transmitting an
4 instruction term in Claim 1, right?

5 A Yes. I agree with that. 03:09:31

6 Q Okay. So the instruction recited in Claim 2
7 is not referring to program instructions recited in
8 Claim 1, correct?

9 MR. KAPLAN: Object to form.

10 THE WITNESS: I guess that's what I was 03:09:45
11 trying to say before. It's referring to the -- to
12 the instruction that we read in that clause of the
13 claim. But it's still a program instruction.
14 That's all I was trying to say.

15 MR. PAK: Okay. I have no further questions. 03:10:02
16 I appreciate your time, Dr. K.

17 Thanks for your time as well, Marc.

18 MR. KAPLAN: Sure. I'm just thinking for a
19 moment.

20 We'll reserve signature. And no questions 03:10:18
21 for me.

22 THE VIDEOGRAPHER: We are off the record at
23 3:10 p.m. This concludes today's testimony given by
24 Dr. Chris Kyriakakis. Total media used was five and
25 will be retained by Veritext Legal Solutions. 03:10:38

1
2 I, CHRISTOS KYRIAKAKIS, do hereby declare
3 under penalty of perjury that I have read the
4 foregoing transcript; that I have made any
5 corrections as appear noted, in ink, initialed by
6 me, or attached hereto; that my testimony as
7 contained herein, as corrected, is true and correct.

8 EXECUTED this _____ day of _____,
9 20____, at _____, _____.
(City) (State)

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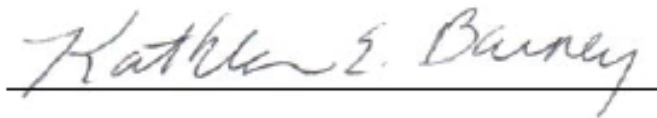
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2
3 I, the undersigned, a Certified Shorthand
4 Reporter of the State of California, do hereby
5 certify:

6 That the foregoing proceedings were taken
7 before me at the time and place herein set forth;
8 that any witnesses in the foregoing proceedings,
9 prior to testifying, were placed under oath; that a
10 record of the proceedings was made by me using
11 machine shorthand which was thereafter transcribed
12 under my direction; further, that the foregoing is
13 an accurate transcription thereof.

14 I further certify that I am neither
15 financially interested in the action nor a relative
16 or employee of any attorney of any of the parties.

17 IN WITNESS WHEREOF, I have this date
18 subscribed my name.

19
20 Dated: June 14, 2021

21
22 
23

KATHLEEN E. BARNEY

24 CSR No. 5698